Safety Maintenance

EST. 1901 • AMERICA'S PIONEER MAGAZINE IN ITS FIELD • MARCH, 1957 • 50¢

Published By Alfred M. Best Company, Inc.

Protection from Heat

These AO Specially Tanned Cowhide Quality Heat Gloves and Mittens Give You Both! . . .

High Heat Resistance Longer Wear

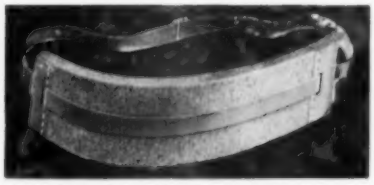
AO SC5X166 HEAT GLOVE. Chrome tanned split cowhide leather, specially tanned to resist heat. Clute cut. Heavily lined for extra heat insulation. Reinforcing leather strap around crotch of thumb. 4" leather cuff, lined.

AO SC6X151 ONE-FINGER MITTEN. Chrome tanned split cowhide. Heavy lining makes splendid heat barrier. 4" leather cuff, lined. NOTE: Also available in full mitten as AO SC6X180.

A glove or mitten that will wear longer is always a good buy. A glove or mitten that gives top protection against heavy heat exposures *plus* longer wear is an even better buy!

The American Optical heat gloves shown are *best values* for operations involving heat where hard wearing qualities, not found in asbestos* are required — such as die casting, drop forging, block bending in shipyard work, steel mill coil tying and similar jobs. These gloves and mittens are specially tanned cowhide, feature full heavy liners and can also be ordered with *heavy lined duck cuffs* in lieu of leather, thus offering additional savings. Buy the best . . . It costs no more! Your nearest American Optical Safety Products Representative can supply you.

*American Optical high heat gloves will handle many foundry operations as well as asbestos and are considerably lower in price.



American Optical Sweatbands increase worker comfort and efficiency, decrease accidents. Check your needs!

Always insist on AO trademarked Safety Products

American Optical COMPANY
SAFETY PRODUCTS DIVISION

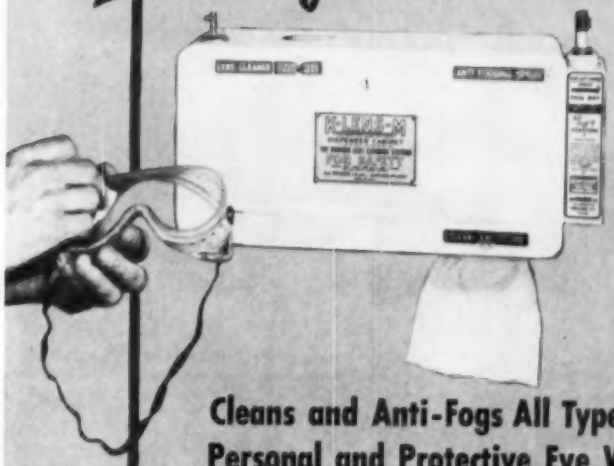
SOUTHBRIDGE, MASSACHUSETTS
BRANCHES IN PRINCIPAL CITIES

(For details, use Key # B-1 on card on page 43)

K-LENS-M

REG. U.S. & CAN. PAT. OFF.

For Safe Clear Vision



Cleans and Anti-Fogs All Types of Personal and Protective Eye Wear

For Glass or Plastic

Wise to Choose — Safe to Use

COPYRIGHT THE WILKINS CO. INC. CORTLAND N.Y.

The Modern Liquid Method for Thorough Cleaning and Anti-Fogging of Glass or Plastic

FREE TEST SAMPLE

Send for complete information on your company letterhead

Effective — Economical

Easy to Install, Use & Service

THE WILKINS CO., INC.

CORTLAND 2, N. Y.

- Lens Cleaning Cabinets
- Lens Cleaner
- Lens Tissue
- Anti-Fogging Stations
- Anti-Fogging Liquid

(For details, use Key # B-2 on card on page 43)

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Workman lifting case-hardened steel parts out of salt bath with gloves made of R/M Silvabestos.

REVOLUTIONARY NEW R/M Silvabestos® CLOTHS...for lightweight safety garments that wear up to 3 times as long

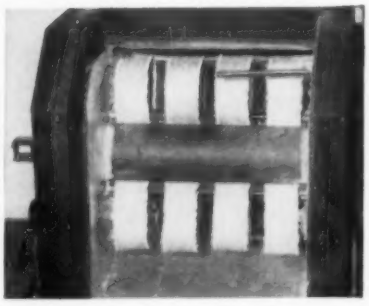
Using R/M's revolutionary new Silvabestos-coated cloths, garment manufacturers can now make safety clothing that is lighter in weight, yet wears up to three times as long as that made from uncoated types. Silvabestos means lower costs per year and a big extra dividend in efficiency, because garments made of it are more comfortable, less fatiguing.

Tested on the Abradoflex Machine at the Asbestos Textile Institute, Philadelphia, R/M Silvabestos-coated cloths offered from 36 to 297% the resistance to wear of the same cloths uncoated. The same favorable comparison is revealed by the Wyzenbeck Wear Tester, which is widely used to measure the resistance to destruction of upholstery fabrics and carpets.

In addition, Silvabestos cloths show a markedly superior resistance to heat degradation. After exposure to a temperature of 450° F for one hour in a muffle furnace, the Silvabestos cloths have 27 to 56% higher residual tensile than the same fabrics uncoated.

The desirable qualities of Silvabestos are the result of an aluminum-resin coating applied by an original R/M process. Silvabestos should not be used in contact with an open flame. It has only moderate reflectivity and should not be offered as a substitute for Minnesota Mining's mirror-bright aluminum finish. Complete Abradoflex, Wyzenbeck and heat resistance test data will be furnished on request.

Raybestos-Manhattan does not make safety garments—only the cloth for fabricating them. Send for list of leading manufacturers making safety clothing from genuine R/M Silvabestos.



The Abradoflex Machine, developed by Dr. Myril C. Shaw, of the Asbestos Textile Institute, Philadelphia, Pa., is designed to test samples of cloth by simultaneously flexing, creasing and abrading them against an emery cylinder (across center of machine). Tests on this machine showed Silvabestos provided up to three times the wear resistance of uncoated asbestos cloths.

R/M

RAYBESTOS-MANHATTAN, INC.

ASBESTOS TEXTILE DIVISION, MANHEIM, PA.

FACTORIES: Manheim, Pa.; No. Charleston, S.C.; Bridgeport, Conn.; Passaic, N.J.; Neenah, Wis.; Crawfordsville, Ind.; Peterborough, Ontario, Canada

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Safety Maintenance

formerly "SAFETY ENGINEERING"

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Cover picture by courtesy of E. I. duPont deNemours & Co., Inc.

AMERICA'S PIONEER MAGAZINE IN ITS FIELD

SAFETY MAINTENANCE is indexed regularly by Engineering Index, Inc., New York

COVER GOGGLES
for all-around protection

SOFT VINYL FRAMES

. . . safe, comfortable, form-fit

Stac-Vent (SV) Ventilation provides clear, fog-free vision — greater protection. Also: regular (RV), screen (CV) or no (NV) ventilation.

HEAVY IMPACT PROTECTION

Replaceable, optically perfect methacrylate lenses in models 440 SV (clear frame) and 460 SV (green frame). Clear (C) lens is .125" thick; light (G2), medium (G4) and dark (G6) green lenses are .080" thick. Lenses meet Federal Specifications for "drop ball" and "drop needle" tests.

AVERAGE IMPACT PROTECTION

Replaceable, optically perfect acetate lenses in models 441 SV (clear frame) and 461 SV (green frame). Clear (AC) lens is .060" thick; green lens (AG) is .050" thick.

Soft Vinyl Frame Goggles Fit Over Any Prescription Frame

SOFT VINYL BLACK FRAME

Opaque black frames with methacrylate (Model 490) or acetate (Model 491) lenses. Stac-Vent ventilation only. Lenses available in medium (G4) or dark (G6) green.

WELDING GOGGLES

Welding goggle (Model 492) with removable lens holder. Replaceable standard 50 mm round, Federal Specifications welding filters available in shades 3, 4, 5 and 6. Glass filters inside and outside protected by acetate cover lenses.

RIGID FRAME COVER GOGGLES

Molded Curved (Models 7 and 27) and Molded Square (Models 1-N regular and 30 extra large). Fit over most metal frame and rimless glasses. Frames available in crystal, green or black. Replaceable methacrylate lenses in clear (C), light green (G2), medium green (G4) and dark green (G6).

SAFETY SPECTACLES
light, comfortable protection

TUC-AWAYS

. . . featherlight and safe

HEAVY DUTY METHACRYLATE LENSES are optically perfect, .105"-.115" thick for impact protection. They will not shatter or pit. Lenses provide full, clear vision with side shield or cup type side and bottom protection. Meet Federal Specifications for "drop ball" and "drop needle" tests.

ONE SIZE FITS ALL WORKERS. Wearer adjusts and maintains his own spectacles. Universal nosepiece and adjustable Retrax Temples assure perfect fit.

Choice of 3 Temple Styles

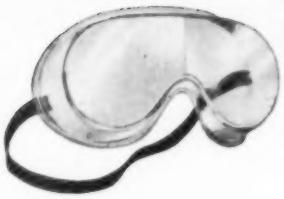
TUC-AWAYS		VISOR TUC
Model 415	Plastic Retrax Temples	Model 425
Model 412	Metal Retrax Temples	Model 422
Model 410	Plastic Club Temples	Model 420

VISOR TUCS

. . . over eyes protection

All the features of Tuc-Aways plus over-eyes visor protection from glare and flying particles. Visor fits comfortably against forehead.

WATCHEMOKET eye SAVERS



[illegible]

Close fitting for maximum protection and comfort. Optically correct, full, all-around vision — no distortion of image through lens area. Cheepee Model 99 is medium size .040" thick acetate goggles. D-Lux Model 100 is extra large size .050" thick acetate goggles.

[illegible]

Ideal for visitors' protection. Lens and visor molded in one piece, formed of optically perfect .080" thick methacrylate in clear (C) with black painted visor, light green (G2) and medium green (G4). Retrax temple and lens angling device permit easy adjustment — comfortable fit. Model 55.

[illegible]

Split-Joint plastic frame enables quick, easy lens replacement. Plastic Retrax Temples telescope in and out for perfect fit. Double bridge design increases strength of frame. Model 80 is frame only, furnished for prescription use with standard 47 mm P-3 shape lenses. Model 80 MS is frame and optically perfect, curved, methacrylate, plano lenses, .080" thick.

[illegible]

New low-cost safety spectacles for visitors' use. Cast acrylic lenses provide excellent protection. Nylon frame is virtually unbreakable. Entire spectacle is light and comfortable — weighs less than an ounce. Model #201. Has highly styled Club Temples.

[illegible]

Featherlight Tuc-Overs are all plastic with integral visor protection. Clip on prescription glasses for protection against medium impact, glare and sparks which might pit the glass lenses. Model 175 (Medium), Model 176 (Large). Both models are available with either the new "orbital" lenses or dropeye lenses. Frames are available in translucent white or green.

[illegible]

Handsome, lightweight frame curved to fit forehead. Optically perfect, curved, methacrylate lenses snap-in and snap-out for easy replacement. Model 595 has Metal Retrax Temples, Model 590 has Club Temples. Furnished with protective case.

WATCHEMOKET OPTICAL CO., INC.

232 WEST EXCHANGE ST., PROVIDENCE 3, R. I. In Canada: Levitt-Safety Limited, Toronto 10, Montreal 26, Winnipeg

(For details, see Key # 8-4 on card on page 43)

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it's SAFE to say

• YOUR SLIP IS SHOWING

Continuing well to the forefront of industrial accidents is the incidence of slips and falls. In fact, in many industries, the causative factor of slips and falls is # One on our Industrial Casualty Parade. This is particularly true in those locations where there is accumulation of grease or liquids.

Several years ago, the State of Kansas released a survey of accidents showing that walking or standing was the most hazardous of all jobs in industry—far outranking in number the more spectacular type of accident which receives banner headlines in the daily press. In one year, falls accounted for 29 percent of all accidental deaths in that state, outnumbering motor vehicle fatalities.

Depending upon the nature of his job, not every man in industry needs a pair of goggles, an asbestos suit or a respirator. But virtually every industry—even an office—presents some form of slipping or falling hazard and therefore the exposure to slips and falls is greater. Equally obvious is the fact that more people are hurt accidentally in the home than in industry for the same reason—more of us are exposed to such accidents.

The problem of slips and falls is one that lends itself to comparatively simple treatment. Nine times out of ten, the hazard can be eliminated entirely or at least reduced to the minimum. Hackneyed warnings—verbal or printed—can be ineffectual especially when the remedy is the removal of the cause of most slipping accidents.

Hazardous walking surfaces can be removed as a threat to employee safety. In most instances, the installation of anti-slip treads, plates or walkway surfaces automatically solves the problem. Oil and grease removal, proper floor maintenance with safe cleaning and finishing products, slip-resistant shoe soles and even the factor of adequate lighting without glare or shadows all will prevent losses arising out of slipping accidents and falls.

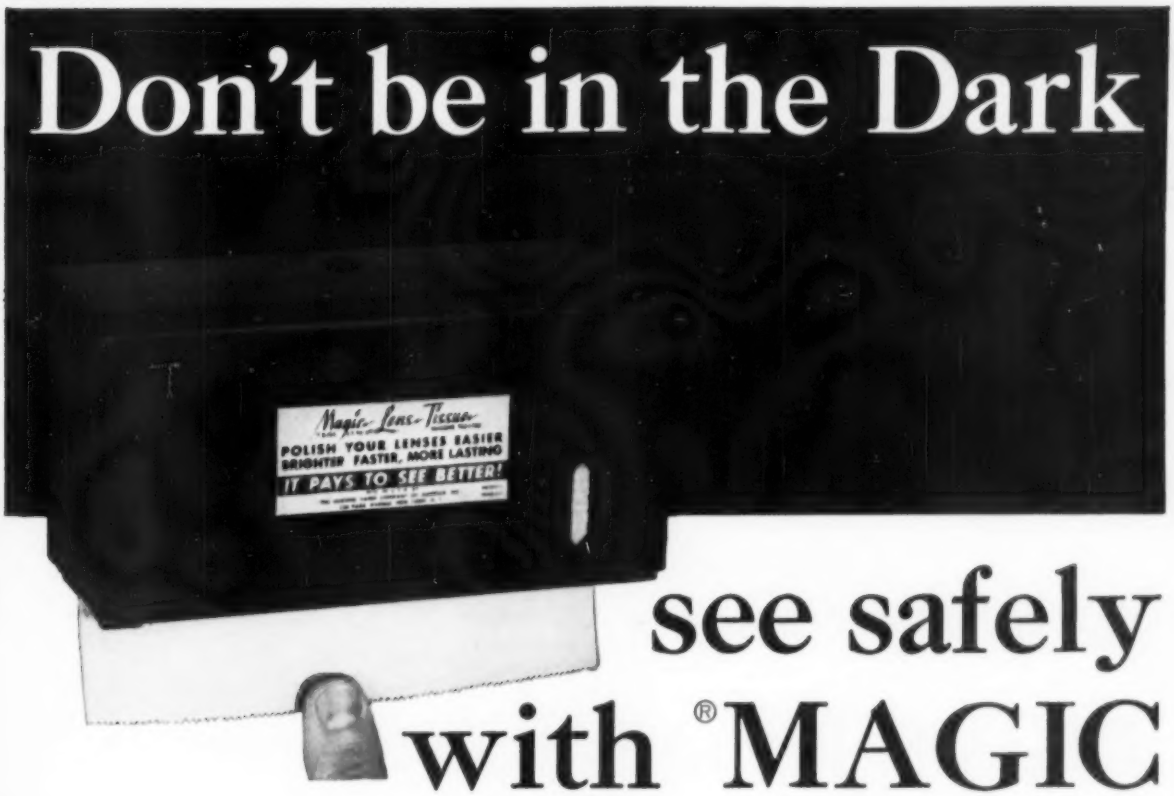
One of the greatest hazards of falls is the frequency of back injuries, so difficult to diagnose and treat successfully. It is in this area that losses really can pile up over a long period of time.

Recognizing the existence of hazardous walking surfaces and their threat to employee safety is the first step toward the elimination or reduction of slipping accidents and falls.

• SKIN AND BONES

While removal of the slipping hazard will do much to prevent broken bones, the employee's skin, too, requires protection in industry. Not less than 65 percent of all industrial disease is represented by dermatosis or inflammation of the skin. Elsewhere in this issue, an eminent medical authority reports that the United States Public Health Service made a survey of over 100,000 industrial workers to determine the frequency, severity and treatment of dermatosis in industry. Scientifically compounded barrier creams designed for special exposures help to control this hazard but personal hygiene is the first approach to healthy skin. H.A.

Don't be in the Dark



see safely with ®MAGIC

Ten times as many acc nts arise from lack of proper vision as from injuries to the eye. Eye injuries are now 2% of the safety problem. Foul sight constitutes 25%. Safety eyewear must be cleaned with something. That something should be MAGIC SILICONE LENS TISSUE. It is the only first-class sheet of Silicone-treated tissue made in the United States; a marvel of the papermakers art; the finest quality to be found in the world. Each sheet is over 50% larger than usual, and has twice the tearing strength. Yet because of our volume our tissue costs you less. Deposits a protective film of sparkling Silicone on the lenses. Polishes and protects as it cleans instantly. Compact steel Dispenser has no bothersome lever to break or any moving parts. Self-mounting—just stick it to the wall. Tissue (6 refills) $8.40 per carton; Dispenser $2.50 each, or free when exchanged for any other cleaning stations.

MAGIC Pop-Up Pack in self dispensing box for your desk or any place in the office, plant or laboratory, $11.95 per carton of twelve Boxes.

MAGIC HEAVY-DUTY cleaning station for grimy, oily, areas where washing with a fluid is unavoidable, or where Anti-Fogging treatment is required, use on plastics or any eyewear. MAGIC Cleaning and Anti-Fogging Fluid is combined in one can, *pressure-packed*. Touch the top and Presto! the can does the rest. 12 12-oz. cans per carton $12.50. About 1400 applications per can. Or, if you wish to use your own home made fluid, we can supply our adapter ($2.70) with a giant 16 oz. bottle and plunger complete. The Heavy-Duty Paper is our superb, super-strong, wet-strength sheet. Naturally, no scratching on plastic, and no lint, 18 big 760-sheet refills per carton at only $11.60. Indestructible steel Dispenser ($5.95) releases these interfolded sheets one-by-one, not in bunches, greatly reducing waste. Go Modern, Buy MAGIC. All prices F.O.B. shipping point. Order Now! Exchange all your other stations for Magic FREE. Wire or write us or your safety jobber today.

Magic
T.M. REG. U.S. PAT. OFF.
Cleaning Stations

THE SILICONE PAPER CO. OF AMERICA, INC.
75 East 45th St., New York 17, N. Y.

SERVING EVERY MAJOR INDUSTRY IN AMERICA

(For details, use Key # B-5 on card on page 43)

U.S. Safety Service Co. has always emphasized the importance of good employee relations. This goodwill dinner was given for the men and women who plan, design, tool, fabricate, assemble, test, and ship U.S. Safety equipment.

CRASHING THE "STYLE" BARRIER

The Success Story of a Company's Progress and Dramatic Growth to a Dominant Position in the Safety Equipment Field . . . Based on a Policy of Creating Newly Styled, Attractive Safety Eyewear, and of Utilizing Proven Superior new Materials.

By Irving "Speed" Wallace *

BACK in 1936, when the United States Safety Service Company opened its doors for business in Kansas City, Missouri, industrial eye safety was still in its horse and buggy days. Safety eyewear, by and large, was heavy, ill-fitting, uncomfortable to wear. Lens shapes were almost perfectly round, which gave the wearer an unattractive, "owlish" look. This lack of style was certainly no incentive to wear eye protection.

All too often, when the accident happened, the eye protection which could have saved an eye was on the bench because "They hurt my nose and ears," or "They made me look funny."

It was soon apparent to Founder A. F. Parmelee that no real break-through could be made in lowering eye injury frequency rates until the problem of employee acceptance and wearability was solved. Reminding, begging, even threatening the workers could not make them wear eye protection consistently because of the undesirable features.

On the other hand, in the streetwear optical field, dramatic changes were being made in the design of eyewear, to make it fit more comfortably, give wider vision, rest lighter on the nose, and appeal to the universal desire for up-to-date styling.

Observing this paradox, Al Parmelee, President of U.S. Safety, made a decision to enter the manufacturing field and to develop, design and manufacture an exclusive line of modern safety eyewear.

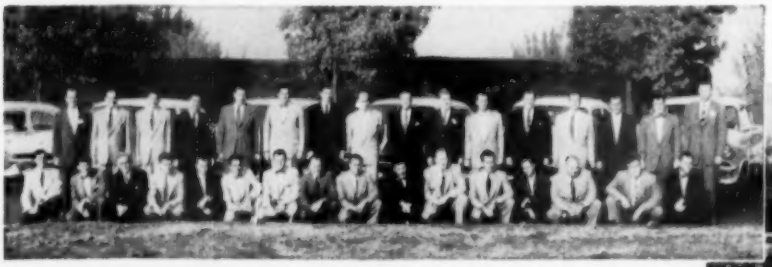
U.S. Safety's first product—the SAF-I-SHIELD — appeared soon after. Its new styling, light weight and new optical plastic material was immediately and widely accepted.

Engineering & Design reconciles the visions of new style with practical functional requirements.

Other modern new designs, combined with new proven superior materials, followed—flexible frame eye shields, chemical eye shields, all plastic face shields, all plastic specs, plastic and metal frame spectacles, and a dramatically new lightweight safety lens material, called OPTILITE—which has twice the strength of safety glass and only half the weight.

*The writings of Irving Wallace, author, writer, and world traveler, have appeared in more than 200 different magazines, newspaper syndicates, books, and on the radio, television, and motion picture screen.

Research & Development teams devote full time to improving present materials, testing, and probing for new materials and new methods.



U.S. Safety products are sold direct to the user by 32 full-time sales representatives through sales offices located in all principal cities.

(For details, use Key # B-6 on card on page 43)

Many thousands of prescription safety lenses are fabricated in this Laboratory.

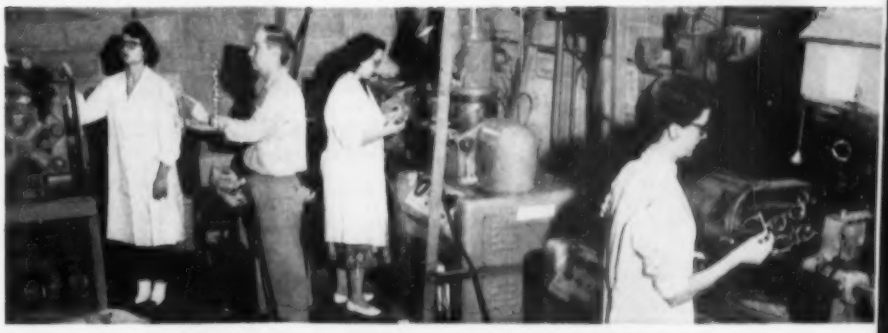
Plastic safety frames are assembled in this area.

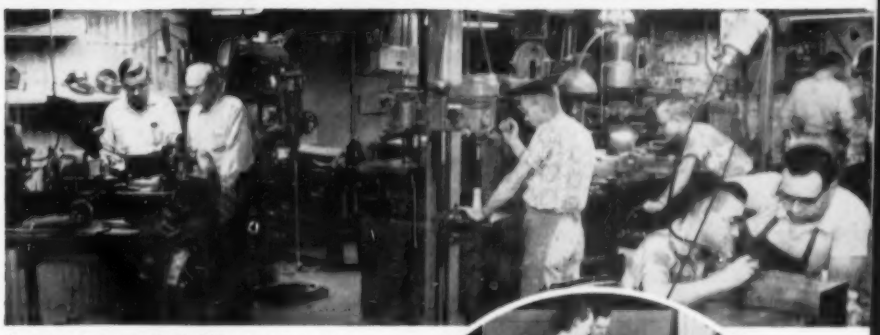
Since entering the manufacturing field, U.S. Safety has pioneered in the development and design of twelve original and distinctly different types of protective equipment. Included is a complete line of eye protection plus a modern Rx laboratory. All products have these features in common: They have style and are attractive—and they are comfortable.

Today, as the company goes into its second 20 years of service, all products in its line are of U.S. Safety's own development, design and manufacture. All are sold **direct** to the user, through U.S. Safety's own staff of trained, full-time Safety Service Engineers, located in all principal cities, who serve as eye safety consultants to the user.

Last year, U.S. Safety sales representatives traveled nearly one million miles working with Industry to Make Safety Work.

All components for U.S. Safety's plastic frames are injection molded in this department.





Complete Tool and Die facilities contribute to flexibility and production efficiency.

Noting the downward trend in accident frequency curves, when U.S. Safety's products are used, progressive safety men are now convinced that U.S. Safety's "new look," "new feel," and "new service" have started something that is here to stay.

A new era of industrial eye safety has been pioneered by U.S. Safety with the policy "make it attractive — make it comfortable—and the employee will wear it."

A compelling desire to create new and better safety equipment —that is a real and living part of U.S. Safety's story.

Quality & Standards Control is responsible for maintaining U.S. Safety's policy to produce only the highest quality.

Sales and Customer Service are handled by this group in the General Office at Kansas City.

Exclusive Design for extra safety

HOOD GAUNTLET

This all-purpose neoprene-coated industrial gauntlet has reinforced 6" cuff *with anti-rip binding* for complete forearm protection. Fully curved fingers for proper fit and flexibility. No bunching on palm—no binding on back. *Reinforced thumb crotch* for extra wear. Industrial weight, 14½" over-all.

Write today for free Hood Glove Guide—shows you how to choose the RIGHT glove for EACH job.

HOOD RUBBER CO.,

a division of the B. F. Goodrich Company

WATERTOWN, MASS.

RUBBER • NEOPRENE • PLASTIC COATED INDUSTRIAL GLOVES

(For details, use Key # B-7 on card on page 43)

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Through Fire Protection—

Explosion-Proof Truck ... 40
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high-pressure and high-temperature molding for extra

LAMINATED PROTECTION

outside

Laminated construction means M-S-A Skullgard protection is built-in, layer by layer. More than 6 different materials, blended to provide maximum strength without excessive weight, are used. This method of exactly positioning the reinforcing pieces for maximum safeguard led to the development of the M-S-A "Danger Zone" protection. But that's only part of the protection story. To make sure these material layers are *permanently welded*, more than 2000 pounds of pressure, and carefully controlled heat, are applied. The result is a one-piece, smooth, laminated shell that gives workers an extra margin of safety.

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inside

M-S-A Skullgard suspensions are designed to provide maximum protection, better distribution of impact. Crown straps are of high quality material selected for strength, comfort and durability. The entire suspension assemblies are tailored for top comfort. Available in Snap-in Adjustable type, Standard Sized Laced type, Adjustable Laced type.

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Richmond, Va. *March 3–5*

Southern Safety Conference & Exposition (John Marshall Hotel). W. L. Groth, Executive Director, P. O. Box 8927, Richmond 25, Va.

Philadelphia, Pa. *March 13–14*

Twenty-Third Annual Philadelphia Safety & Fire Conference and Exhibit (Bellevue-Stratford Hotel). Harry H. Verdier, Manager, Philadelphia Safety Council, c/o Chamber of Commerce, 121 S. Broad St., Philadelphia 7, Pa.

New York, N. Y. *March 18–22*

Twenty-Seventh Annual Greater New York Safety Convention and Exposition (Hotel Statler). Carl F. Olander, General Chairman, Greater New York Safety Council, 60 E. 42nd St., New York 17, N. Y.

Boston, Mass. *March 18–19*

Thirty-Sixth Annual Massachusetts Safety Conference (Hotel Statler). Bruce Campbell, Manager, Massachusetts Safety Council, 31 State St., Boston 9, Mass.

Los Angeles, Calif. *March 18-20*

Fourth Annual Greater Los Angeles Safety Congress & Exhibit (Ambassador Hotel). Los Angeles Safety Council, Room 496, 610 S. Main St., Los Angeles 14, Calif.

Fort Wayne, Ind. *March 19–20*

Fourteenth Annual Northeastern Indiana Safety Conference and Exposition (Chamber of Commerce Building). Ivan A. Martin, manager, Safety Council, Ft. Wayne Chamber of Commerce, Ft. Wayne 2, Ind.

Pittsburgh, Pa. *April 2–4*

Thirty-second Western Pennsylvania Safety Engineering Conference & Exhibit (Sheraton Hotel). Harry W. Brainerd, executive manager, Western Penn. Safety Council, Inc., 605 Park Bldg., Pittsburgh 22, Pa.

Gainesville, Fla. *April 3–5*

Fourth Annual Conference on Accident Prevention Engineering (University of Florida Campus). Donald B. Wilcox, Conference Coordinator, College of Engineering, Gainesville, Fla.

Columbus, Ohio *April 9–11*

Twenty-Seventh All Ohio Safety Congress & Exhibit (Deshler Hilton Hotel). A. W. Moon, Congress Manager. Rm. 611, Ohio Departments Bldg., Columbus 15, Ohio.

Kansas City, Mo. *April 11–12*

Central States Safety Congress (Hotel President). G. M. Burns, director, Kansas City Safety Council, 419 Dwight Bldg., Kansas City

Grand Rapids, Mich. *April 23–25*

Twenty-Seventh Annual Michigan Safety Conference & Exhibit (Civic Auditorium).

Syracuse, N. Y. *April 29–May 1*

Fifth Central New York Safety Conference & Exposition. Safety Division, Syracuse Chamber of Commerce, 351 South Warren St., Syracuse 2, N. Y.

Bethlehem, Pa. *May 6–8*

Thirtieth Annual Eastern Pennsylvania Safety Conference, Harold A. Seward, Secretary-Treasurer, Lehigh Valley Safety Council, 602 E. Third St., Bethlehem, Pa.

Niagara Falls, N. Y. *May 8–9*

Seventeenth Western New York Safety Conference, in co-operation with the American Society of Safety Engineers (Niagara Hotel). Patsy E. Gismondi, Executive Secretary, 1436 Delaware Ave., Buffalo 9, N. Y.

Winston-Salem, N. C. *May 9–11*

Twenty-seventh Annual North Carolina Statewide Industrial Safety Conference (Robert E. Lee Hotel). H. S. Baucom, Director of Safety, North Carolina Industrial Commission, Raleigh, N. C.

Duluth, Minn. *May 23–24*

Thirty-Third Annual Conference, Lake Superior Mines Safety Council. Allen D. Look, secretary, Lake Superior Mines Safety Council, 329 Federal Bldg., Duluth, Minn.

New Haven, Conn. *June 4–5*

Twelfth Annual Connecticut Safety Society Conference (Jewish Center Bldg.). Dennis J. Hickey, Manager, Waterbury Mfg. Co., Waterbury, Conn.

San Francisco, Calif. *June 11–13*

Third Western Plant Maintenance & Engineering Show (Civic Auditorium). Clapp & Poliak, Inc., 341 Madison Ave., New York 17, N. Y.

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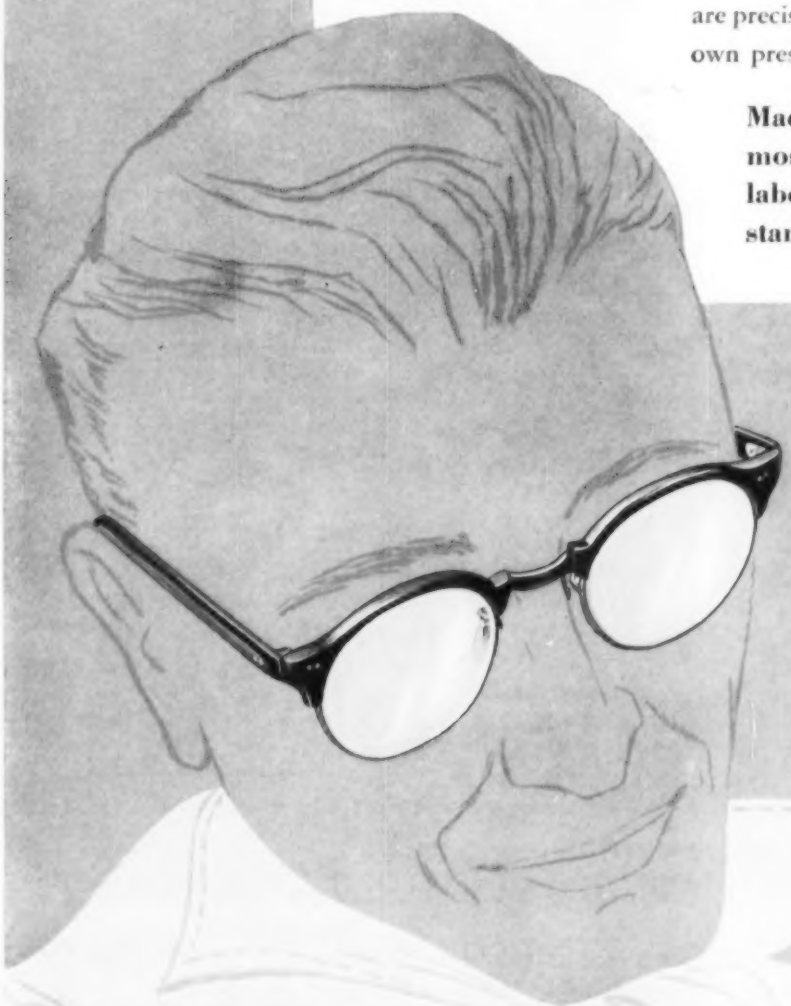

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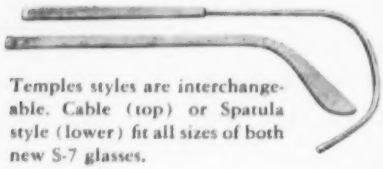

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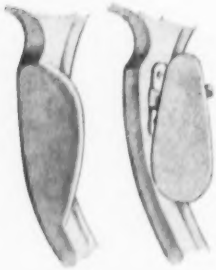

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accidents ...an index of efficiency

by **C. B. BOULET**
Vice President
Wisconsin Service Corporation

Occupational accident costs to U. S. industry are estimated at more than three billion dollars. This $3 billion must be borne by the consumers of products or the purchasers of services. This $3 billion increases the cost of production and so it has a direct bearing on efficiency of production. In one sense, therefore, accidents are not really an index of efficiency but rather an index of *inefficiency*. The reduction of the accident rate is perhaps a better index of industrial efficiency.

Included in the $3 billion are many direct costs which can be easily measured. The first of these is the cost of compensation payments and medical and surgical expense resulting from injuries. For those companies that carry workmen's compensation insurance, these costs are reflected directly in the premiums for such insurance.

Many people have the idea that if one carries insurance he is protected against losses which such insurance covers. In certain types of insurance this is a fact. But this is not true when insurance is carried on workmen's compensation liability. In most states premiums on workmen's compensation risks are based on losses paid over a period of years in the specific industry being insured with adjustment of premiums based on the experience of the specific company insured. Under this type of insurance each insurer eventually pays all the losses which he incurs plus overheads to cover the cost of loss adjustment and administration of the insurance which has been purchased.

As an example, in Wisconsin, workmen's compensation rates are based on industry experience and are adjusted on the basis of experience of individual companies. This adjustment is made on the basis of three years of cost experience. Our own Company represents

an interesting example of how these costs are reflected in costs of operation. In 1956 we secured a credit off the standard rate of 62 percent, which meant that all we paid was 38 percent of the rate established for electric and gas operations.

It so happened that 1955 was for us a bad year so far as costs were concerned. We had a fatal accident and two permanent partial disability cases with high costs. As a result our credit dropped from 62 percent to 39 percent. So next year we will pay 61 percent of the standard rate rather than 38 percent that we are paying this year. In money, that means in excess of $20,000 added to our operating costs.

The many indirect costs don't show up so sharply. Some of them are shown in Table 1.

There are still other costs but this summary leaves no question that **every accident does add to the cost of production** and to the cost of the product or reduction in earnings.

The question that we are trying to answer in this discussion is, **"Is the safe operation the most efficient operation?"**

The report of a committee on safety and production which studied this matter said in part: "A safe plant is approximately 11 times more likely to be a productive plant than an unsafe plant." The report said further: "There is a positive correlation between safety and efficiency of production. The safe operation is the efficient operation." And then again: "Maximum productivity is secured only when accident performance tends toward the irreducible minimum."

Twice within the last 15 years I have been asked by two separate companies if I would be willing to help them improve their safety program. In each case my boss told me to go ahead. In each of these cases I had a long talk with the president of the company and I think I sold him on the idea that unless he personalized the safety program and got behind it himself, there was little use in trying to improve the safety record. Both companies have done a terrific job of improving their accident rate and today they are both outstanding in safety performance.

The second experience relates to a former president of our company. He was back of our program 100 percent. A few years ago he became head of another company which had not enjoyed a very good safety record. Now they are one of the leading utilities in accident control. And I know that one of the big reasons is that the new president of their company has taken an active part in the program.

It is generally true that at the present time practically every electric utility in the country has access to and is providing the same types of protective equipment for its employees. Included in the list are rubber goods of all types, grounding equipment, hot line tools, hard hats, etc. In spite of the fact that all companies have provided all this equipment, the accident rates of the companies vary from near zero to as high as 40 or 45 accidents per million hours worked. Naturally the question is raised, how can this be?

We must recognize that the effects of safety engineering have not always been commensurate with the costs and efforts that have been made, and that the results of safety engineering in many companies have not kept pace with the results achieved through other types of research nor with the trends of other phases of industrial activity.

The statement is often made that approximately 90 percent of all accidents are the result of some sort of failure of the human element. We might call it man failure. Our problem is to try to discover why we have man failures and what, if anything, can be done to reduce or eliminate them.

As a general rule man failures result from certain mental reactions or mental failures. Lack of concentration, failure to understand rules or orders, forgetfulness, fatigue, willfullness, anger, pride, resentment, distractions, daydreaming, worry, fear, lack of knowledge —any one of these mental quirks may set the stage for a bad accident. What steps then can be taken to eliminate conditions which give rise to these mental reactions?

The Work Environment

We must recognize the fact that these reactions may stem from home environment or they may be the result of a diseased condition of the mind. Generally speaking, however, work environment is the principal factor in the development of on-the-job attitudes. Unsatisfactory work conditions—both physical and personal—result in such reactions as "He's playing favorites," "I'm just a number here," "I ought to get more money," "The company doesn't give a damn about us workers," "I never get a break," "Top management is more interested in profits than in safety."

Careful analysis will show that many of the negative reactions of workers are the direct result of management or supervisory failure —failure to understand what makes the worker tick, what makes him produce more or less, what causes him either to cooperate with or oppose the programs developed by management—whether it be in production, sales, elimination of waste, public or community relations, or safety.

In order to develop a proper work attitude, it is necessary to have a program of management-employee relationship which proves to the men that management desires to be fair. There must be a program of good communications,

TABLE 1: The Indirect Costs of Accidents

1. **Wages paid other workers who lose productive time because of the accident.**
2. **Cost of damage to materials or equipment.**
3. **Interruption of normal process of production.**
4. **Supervisor's time required in making out reports, investigating the accident, securing replacement for the injured employee, etc.**
5. **Time of other employees and safety department involved in accident investigation.**
6. **Lowered morale.**
7. **Reduction of efficiency because of a new worker.**

both from men to management and from management to men.

In the area of accident prevention there is a tremendous opportunity for the development of confidence and cooperation of employees. Certainly if these attitudes cannot be developed in connection with prevention of injury to the individual worker, it will be extremely difficult to develop good attitudes to daily work efforts. The corollary of this statement is that if good attitudes are developed through the safety program—if the employees are convinced that management wants to protect them from injury and suffering and their families from loss of wages or loss of the breadwinner, then the same reaction toward management will carry over into the workday and the work effort. The ultimate result is that a climate for higher efficiency is immediately created not only in the prevention of accidents but in the production of goods or the handling of service. An individual cannot be both cooperative and antagonistic at the same time. So here we have a direct correlation of an effective safety program and efficiency. This is one of the basic elements that brings about the statement that a safe plant is an efficient plant.

We talk much of work planning and work simplification, knowing that an intelligent, planned approach to any specific job means that a better job will be done. The trouble is that it is difficult to measure the effect of work planning as such and the supervisor is hard put to know whether a crew or a foreman has actually planned out the work which is to be done on each specific job. It is not so with safety. If a job is not planned carefully from the standpoint of safety, evidence immediately shows a weakness in supervision: accidents occur and supervision and management know that insufficient thought was given to worker protection in that specific instance.

Safety engineers have recognized this fact and have known it for many years.

It is well known that the incidence of accidents is lowest among well-trained, experienced men. It is highest, according to statistics, among new workers who have not acquired good work habits or who have not had sufficient experience to work efficiently.

It is also true that the best production and the greatest efficiency comes in groups where the labor turnover is the lowest and consequently the number of experienced workers is the highest. So here again we have a close correlation between safety and efficiency.

There should be a strong lesson for safety engineers and those who are responsible for the administration of the safety program in a careful study of vital factors:

First, the attitude of the top executive. A safety program cannot succeed unless the top executive is interested in safety. If the boss just isn't interested, then it is the job and responsibility of the safety department to get him interested—to suggest to him ways and means that he can indicate interest in the safety program.

Secondly, planning each job for safety. This can be correlated for efficiency with planning each job for work output.

Finally, the selection and training of men to perform the job efficiently can be definitely related to the job of performing work safely.

In our company we conduct linemen's schools every year. These schools run for four solid weeks. The embryo linemen spend each day in training activities, including classroom work and actual training in the field. Integrated with this training, there is a substantial amount of training in safety. The result is that we have had an almost perfect record in our line departments year after year. Our present accident frequency for the current year, with some 1700 employees, is about .25. We have worked close to 2½ million hours without a single lost-time injury. A good deal of this result is credited to careful selection and careful training.

It is important that safety engineers understand the correlation between safety and efficiency. In many companies, in times of low earnings, the finger is pointed at personnel departments and safety departments as "nonproductive" operations. Unless these departments can contribute not only to the welfare and protection of the individual but to the welfare and earnings of the corporation as a whole, they are in a poor defensive position in times of stress.

Those involved in accident prevention activities must learn to take a broader viewpoint of the company's operations. They must know something about employee selection, employee training, employee attitudes, work simplification, plus communications and overall planning. If we raise our sights to take in this entire area, we will soon discover how to make the safety program contribute more toward reducing inefficient operation.

From an address presented at the 18th Safety Meeting of Ebasco Client Companies. Picture from Philip Gendreau.

How to Get a Top Executive Interested in a Safety Program

1. Suggest that he write personal letters to supervisors or department heads when a good job has been done.

2. Suggest bulletin board material with the executive's picture and a statement from him regarding accident prevention.

3. Suggest a story in the company magazine including statements from the executive relating to the safety record and management's desire to improve that record.

4. Suggest recordings made by the executive to be played to employee groups or other employee meetings.

HOW TO:

Issue Protective Clothing
Beat the Ash-can Consumption of Soiled Gloves
Get Employees to Wear Protective Clothing

Personal Protection Stands Guard When...

In the petroleum refinery everyone wears a hard hat, even the guard.

Human Failure Comes In

by **MERRICK PRATT**
Safety Engineer
The California Oil Co.
Perth Amboy, New Jersey

The best form of body protection, of course, is to eliminate those possibilities for injury which make a lot of special clothing and cumbersome equipment necessary. This area of safety activity is constantly being expanded, and the progress is encouraging. Modern metallurgy and inspection keep the acid in the pipe, the steam in the boiler, and the caustic on the inside of the valve packing most of the time. The present subject starts where plant equipment leaves off, or more importantly, where human failure comes in. We may be approaching fool-proof equipment but we have not yet learned how to make idiot-proof equipment.

Personal protective equipment is used extensively in petroleum refining. To make products for today's high-octane-hungry vehicles, we heat hydrocarbons to prodigious temperatures. We squeeze these same hydrocarbons under terrific pressure. And at the same time we introduce all manner of devilish acids and caustic treatments, all of which means a need for employee protection commensurate with the exposure.

Taking a brief look at the type of equipment used to separate the employee's body from potential damage, let's proceed from the top down, which means that every man in the plant wears a safety helmet, except when he is in a car or an office. He wears one summer and winter, day and night. There is quite a history behind this, going back some thirty years to the drilling end of the oil business. The increased use of helmets spread slowly from the specific jobs con-

sidered most hazardous, such as overhead riveting, to the present universal program which includes visitors and contractors in the plant.

Employees of The California Oil Company have a choice of a cap-type, or the full-brimmed hat. The Safety Engineer recommends the hat, but actually the cap is most popular. However, when we have a freezing rain which runs from a cap down the back of the neck, we usually convert a few more workers to hats. A variety of colors is available, each color designating a specific group. With the exception of our electricians and welders, aluminum is used. The electricians have 15,000 volt approved plastic hats and caps, and the welders a special hat designed for them and made of phenolic resin.

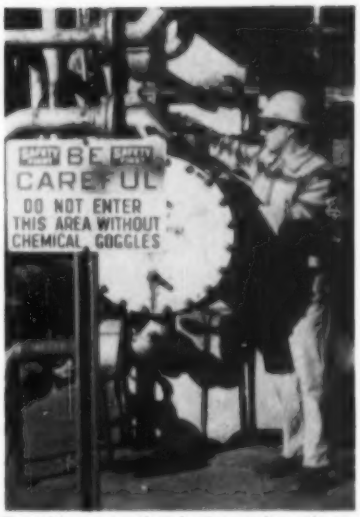
A hat program entails a complete supply of winter liners, chin straps, etc. We have some specialized applications, such as the combination welding hood and hard hat. This last application has resulted in custom-made equipment to overcome a series of complaints from our welders.

We make every effort to "tell the story" when a hat saves a head, and see that the word gets around, as it did recently, when one of our Mail Boys slipped on some ice, went head over heels, and lit right on his helmet. We have few examples of falling objects, but a great many examples of men butting into things. An example of one we missed was a senior engineer who recently came up under a filing cabinet drawer.

Progressing down from helmets we come to protective clothing. First of all, we expect our employees to wear reasonable personal work clothes. From time to time it is necessary to ban a pair of Mediterranean beach slippers, or to insist on at least a short sleeved shirt. Also, while Bermuda shorts may be acceptable on the floor of the New York Stock Exchange, they are not in style for firing crude unit furnaces.

We have not yet taken a stand against certain synthetics which are less desirable than cotton and wool from a fire protection point of view. But I understand synthetic undies are not permitted in some plants because of serious burns received by employees who had on the latest in lingerie when a flash fire occurred.

Personal clothing aside, each plant employee is issued a wardrobe of the following equipment as



For this area, chemical goggles, gloves.

Air-supplied chemical suit with gloves attached. Air for suit is monitored by the continuous readings on the carbon monoxide alarm shown and filtered prior to passing through the pressure reducing valve in the manifold box also shown.

Fireman wears heat-resistant suit.

Safely dressed for routine operations.

How to Find Out if Your Foremen are Sold on Your Program for Body Protection

Listen in when a foreman is instructing his men on the use of some piece of personal protective equipment.

If your foreman says, *"Now, boys, we are to use this equipment because the Safety Engineer here wants us to,"* your program is not sold.

If he says, *"The Company has a rule about this, and we have to wear this equipment, boys,"* your program is not sold.

If your foreman says, *"I want you to wear this equipment because on this job we are exposed to injury if we don't,"* then your program is sold.

a supplement: Coat and bib-type coveralls (known as rain gear), slush boots, hard hat, and spectacle-type safety goggles with side screens, both clear and green.

Rain gear is our basic form of protective clothing. It is made of a neoprene-type coated cotton, and will withstand all the corrosive chemicals we have at the Perth Amboy refinery. This gear is worn for entry into acid and caustic areas, during normal conditions for entry into columns and vessels where irritating materials may be present, and for dirty jobs to protect the employee's personal clothing. For those who are curious, we also wear this gear when it rains.

For abnormal conditions, such as repair of an acid or caustic leak, we furnish a similar suit made of polyvinyl chloride with flame retardant over cotton. This suit consists of an air-filled hood, and coat with attached gloves, in addition to the bib-type coveralls.

Another highly-specialized type of clothing is a heat resisting suit used by the plant's fire department for emergencies. We do not use this type of gear for maintenance on the theory that if an area is that hot we should devise some other way of doing the maintenance work. Although we are prepared, we have yet to use these suits except for drills at our fire school, where we found that the suit permits work right up to a fair-sized petroleum fire.

We have also tested a number of types of heat suits of the reflecting type, in an effort to obtain one that would also give protection against conducted heat from contact with hot surfaces. Here we are trying to lick a problem that comes up occasionally when a leak develops in the catalyst system of our cat cracker. When this happens, small beads of silica—at about 1,200 degrees—rain down and pile up like snow drifts. Our laboratory tests showed that our double thick suit, which is padded with glass wool, was the best of the then available suits. However, it is not satisfactory for this catalyst job, giving only about 60 seconds of protection.

Cleaning Program

Equipment which is worn by more than one man is cleaned after each use. The dirty clothing is returned to the toolroom from where it is sent to a laundry. Other personal protective equipment which is not assigned to an employee, such as respirators, breathing apparatus face pieces, acid hoods, is washed by a toolroom employee. We prefer to use hot water and soap. Although we tried some of the patented solutions, we experienced difficulty with either skin irritations or the equipment dissolving along with the dirt. Cleaned equipment is packaged in pliofilm bags which are stapled closed. A man receiving the equipment in the field knows when he breaks open the bag that the face piece he is about to put over his face is clean.

Before going on to other features of body protection, let's look at the administration of this clothing program. All of our employees do not need all of the issued equipment. About 90 percent of them do. The remaining ten percent need some of the equipment, but each segment of that group requires different articles.

At first we issued slush boots, for example, on an as-needed basis. We found it was bothersome to a field supervisor to determine which employees had been issued what clothing, and sometimes the job was done without proper clothing as a result. Also, there was a lot of lost clothing during this period, and total issues amounted to more boots than we had employees.

All of this prompted the present system of issuing each man the same thing. While we are not completely satisfied, for us the uniform issue system is the best. Personal protective equipment is charged out to each man in the same way as tools. If the equipment wears out or breaks, he can obtain a replacement for the old article, which must be turned in. Lost personal protective clothing is handled in the same manner as lost tools, and can result in disciplinary action.

From time to time we have requests from employees for additional company-furnished clothing. While the requests are made on the basis of safety, investigation shows that it is almost always an effort to reduce the family clothing budget. If each move along these lines is not studied carefully, it has been our experience that we could speedily drift into competition with the local men's clothiers and, of course, we are trying to maintain good relations with them and want only the clothing business that we cannot avoid. Administration of our program for providing special equipment, such as the acid suits, is done through one central location, our Tool Room, so the equipment can be obtained around the clock in case of emergency.

Issue of Gloves

The subject of protective clothing cannot be covered without at least a brief mention of gloves. We issue everyone in the refinery leather palm, canvas-backed work gloves for regular work. Our plant also has a variety of neoprene gloves for wet jobs and work involving irritating materials.

Recently we tried glove washing to reduce the cost of our regular

Explosion-Proof Twins!

COMPLETELY Explosion-Proof!

Yes, this is the *first* industrial vacuum cleaner which combines portability, efficiency, and *complete safety.*

The MULTI-CLEAN H-500 EXPLOSION-PROOF Vac has been tested by UL and approved for use in Class I, Group D and Class 2, Group G locations.

This now means that you can use this wet-dry vac amid explosive gases, vapors, dust, and in dozens of other situations where danger of explosion or fire had previously made use of a vac too risky.

It's ideal for cleaning floors, walls, overhead pipe, machinery or stock bins where there is grease, chemicals or other flammable materials. And since it works equally well for wet or dry pickup, it's just the thing for cleaning combustible material from storage tanks.

Mills and elevators, chemical plants, petroleum refineries, gas plants, and distilleries are just a few of the locations where this new vac is especially suited.

For more information on the H-500, its powerful ⅞ hp totally enclosed motor, 100% bronze or aluminum construction, and spark-proof electrical fittings . . . see your MULTI-CLEAN Distributor or mail coupon below.

The MULTI-CLEAN EXPLOSION-PROOF Floor Machine, shown below, is engineered for scrubbing, cleaning, buffing, and polishing in presence of combustible gases, liquids, and dust. The completely-enclosed, explosion-proof motor, heavy duty safety switch and connection box are all approved by Underwriters Laboratories, Inc.

Available in 14" and 16" sizes. Both can be equipped with a 3-gallon solution tank and channel feed brush for mechanized scrubbing.

Multi-Clean Explosion-Proof Floor Machine

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(For details, use Key # B-11 on card on page 43)

work glove program, because a study of our use of gloves showed that they rarely wore out. They were, most of the time, just thrown in the ash can because they were saturated with hydrocarbons or wet from rain. The number of pairs that an employee could obtain was left up to the foreman, who was supposed to decide on an individual basis. The custom developed over a period of time, as you might expect, that foremen just handed out gloves on request, and any foreman who didn't was definitely not a good sport!

Protests Encountered

If I told you that we had launched the glove washing program without effort, it would be pure malarkey. Right off the bat we had some squawks about dermatitis. We questioned this as we knew the type of cleaning process used on gloves was the same as that used on a suit sent to the cleaners. At first the complaints were verbal, then we had two men show up with red hands who claimed the malady had come from our newly washed gloves. We were, of course, genuinely concerned and decided to have complete checks made by a specialist. The dermatologist made patch tests on the first two men and on one or two subsequent alleged cases. We found one man was allergic to both new and washed gloves, also to adhesive tape and some other things. The others were not affected. The dermatitis, which we suspect was just chapped hands, has subsided. It has been a lot of effort for our foremen, but they are now obtaining results. As the program calls for turning in old gloves, we have licked the ash can consumption of our glove supply.

Safety Shoe Protection

We do have a safety shoe program, even though in our Perth Amboy plant there is only a moderate exposure to toe injuries, as our products are largely handled through a pipe, by a truck, or in a barge. Toe injuries have all but vanished and every year we get farther away from oil drums, which is good news to any safety engineer.

In the system we use, shoes are ordered from samples, because we don't try to stock them. Shoes are furnished at cost, less $2.00 per pair, which makes the program attractive enough to get the participation of about 85 percent of our employees and supervisors.

"Selling" Body Protection

You may be interested in a few of our experiences in selling the use of the body protection devices that have been mentioned. As any safety engineer knows, it is not sufficient to just obtain some equipment, and give it to the foreman with the suggestion "when the men go in there they wear this."

The foreman must want his men to use certain equipment because he, their foreman, knows that if they don't they may be injured. This sounds all too elementary, but I sometimes feel that lack of this attitude is the biggest single stumbling block. Perhaps the foreman has got away without using this or that protective equipment. Perhaps he is an old timer who remembers that when he broke in on the job "we were all hairy-chested men who didn't need to cover ourselves up in sissy stuff."

Means of Checking

Your foreman may not tell you he thinks your protective equipment is the bunk. He may want to avoid an argument, or even to spare the safety engineer's feelings. So I would like to suggest how you can find out about how well your body protection program is sold. Stick around some time when the foreman is instructing the men on the use of some piece of personal protective equipment. If he tells them to wear the special equipment because of company rules or the safety engineer wants them to, then you haven't even "sold" the foreman. But if he points out that they may be injured if they don't wear it, then your foreman is convinced.

For my money, personal protection must be sold right down the line. Much of this stuff isn't very nice to wear. Some of it is downright uncomfortable. Most of us are not in military service. We can't have the bugler sound attention while we pass the word, "Now hear this, the uniform of the day will be—." No, the program must be sold.

There are as many ways to sell the importance of this equipment as there are foremen who must be sold, or men under the foremen. One way that works is getting everybody into the act when a decision is made as to the type of equipment to be bought. Of course, we don't consider equipment that does not meet company or legal requirements. However, when there is more than one make that is suitable we always buy a batch of each kind and put them out for test. We solicit the views of the men who will have most to do with using the equipment. Now this method is not easy for the safety engineer. He will be running around trying to get agreement. He will find that the chosen equipment may be supplied by some outfit that makes delivery promptly every seven and a half months. **But, this extra effort helps sell the program.** The men who have picked their own equipment are convinced that they have the most comfortable thing available. If they can show you, instead of your showing them, which is best, you're making progress.

One last thought on selling protective equipment to those that have to wear it. Be sure it's necessary to use the equipment before you try to enforce it. It has been my observation that nothing is quite as cold as an unnecessary program. Those of us who have to do with making the rules, but who do not suffer the consequences, are inclined to make lots of rules in an attempt to get all the bases covered. Maybe our subconscious thought is that because we have made a rule we have discharged our responsibility. One unnecessary rule will, however, weaken five vital rules. It may sound odd for me to be saying, "Wear less protective equipment." However, it is my suggestion —if you want to succeed at selling such a program—that you make very sure what you advocate is necessary.

From an address presented at the 26th Greater New York Safety Convention. Pictures by courtesy of The California Oil Company.

SHOW YOUR EMPLOYEES:

How to Work Without Straining... Their Muscles, That Is!

SAFE LIFTING METHODS

1. **Inspect load to make sure you can handle it yourself and decide the best way to grasp it.**
2. **Get a firm footing close to the object to be lifted; feet the length of a shoe apart for balance.**
3. **Bend knees and crouch down to the object.**
4. **Keep the back almost vertical and feet apart.**
5. **Get a good grip.**
6. **Straighten knees slowly, rise, keeping load close to the body and directly over feet.**
7. **Lower load just like you lifted it.**
8. **Lift the load waist high and rest it on a support to get a better grip before raising it shoulder high. Bend the knees to give added power for the final lift.**
9. **Rest frequently when carrying load for a long time. A tired person is more subject to strain, sprain, tripping and loss of balance.**
10. **Stop, reduce the load by making more trips or get help when you feel strain or pull.**
11. **Grasp sacked material by diagonal corners and swing to one shoulder with a boost from the knee.**
12. **Take care of muscular aches and pains immediately.**

Whether an employee has suffered from a pulled muscle, sprain, Charley horse or a backache, chances are it could have been prevented. Over 250 thousand workers—and who knows the thousands of housewives and white-collar people—injure their muscles through bad work methods each year.

Translated into time lost from work, such aches and pains are costly. And in terms of personal anguish, only the common cold causes more general discomfort.

Anybody who has ever suffered a sprained ankle knows how much pain can come from a ligament stretched too far. Anybody who has suffered from a Charley horse knows the pain of a muscle spasm. Anybody who has cracked his funny bone knows how pain radiates along a squeezed nerve.

No laughing matter. Like the cold, everybody talks about pain, but no one is quite certain precisely what it is, where it is real and where only psychically apparent. Pain involves stimulation of the nerve which causes a contraction of the surrounding muscle tissue and blood vessels, thereby impeding circulation. A vicious circle. Such impeded circulation increases pain and contraction. Pri-

marily, of course, pain serves as a signal to alert us when tissue is damaged.

Simple neuralgic and muscular pains can be relieved, if we can reach their center, such as by applying a new external analgesic. But in the final analysis, the best medicine is a dose of prevention since we bring most muscular aches and pains on ourselves, both on and off the job.

It's simple enough. Just think a moment about the way you are constructed. Your support and your movement are controlled by your skeleton which is composed of bones and strong bands, called ligaments, that hold the body together at the joints. Extensively distributed over the skeleton to provide power for movement and to give form and substance to the extremeties are the muscles. They are attached to the bones with strong fibrous bands, tendons. This complex structure is given direction and set into motion by the nervous system.

The human body is a remarkable creation. It can be trained to run a mile in four minutes, lift weights as heavy as 800 pounds, jump higher than itself. But how the untrained person abuses it!

We use our muscles—very often the wrong ones—when we should be using our brains. We let our muscles get out of condition, and then suddenly put them to strenuous use. The sedentary worker, who is not usually in shape, likes nothing better than a strenuous two week vacation. While the manual worker, who does a lot of lifting and is in good condition, likes to spend his spare time as motionless as he can. Then, after the first day back on the job, it's an aching back! The typist or the stationary assembly-line worker sits erect in the same position for hours, torturing his lower back muscles which must support the whole weight of the upper torso. We allow one set of muscles to grow fatigued from weariness and another weak from lack of exercise. Yet we think nothing of calling on these undeveloped muscles to exert tremendous effort at a moment's notice.

We defy gravity simply by standing on our hind legs. Our back muscles have to work hard as long as we are awake just to hold us up. And the housewife who picks up a sack of sugar or the stenographer who lifts a typewriter subjects the muscles in her back to tensions of a half ton or more.

The most common sources of muscular aches and pains are poor lifting methods. In fact, one work injury out of four results from poor handling of materials. Just consider: When straightening up from a bent over position, the strain on the muscles, vertebrae, ligaments and discs in the back can amount to more than a quarter of a ton. By lifting with the back at the same time, the weight of the object is multiplied by 15 times or more.

See that all your employees follow these four simple rules, and they'll be working—and playing—without strain.

1. Use your strong leg and arm muscles when you lift—not your back. It has enough to do just supporting you and allowing you to bend.
2. Gear your activity to your age and physical condition. Physical effort, in moderation, is an excellent body builder, but don't carry it to excess. Stop and rest when you feel the danger signals of fatigue.
3. Build up your muscles—but in easy stages. And don't just concentrate on your biceps; get as many of your muscles as you can into the act.
4. Change your working position as often as you can. If your job is a sedentary and stationary one, watch your posture. Periodically rest the set of muscles in constant use; don't let yourself tense.

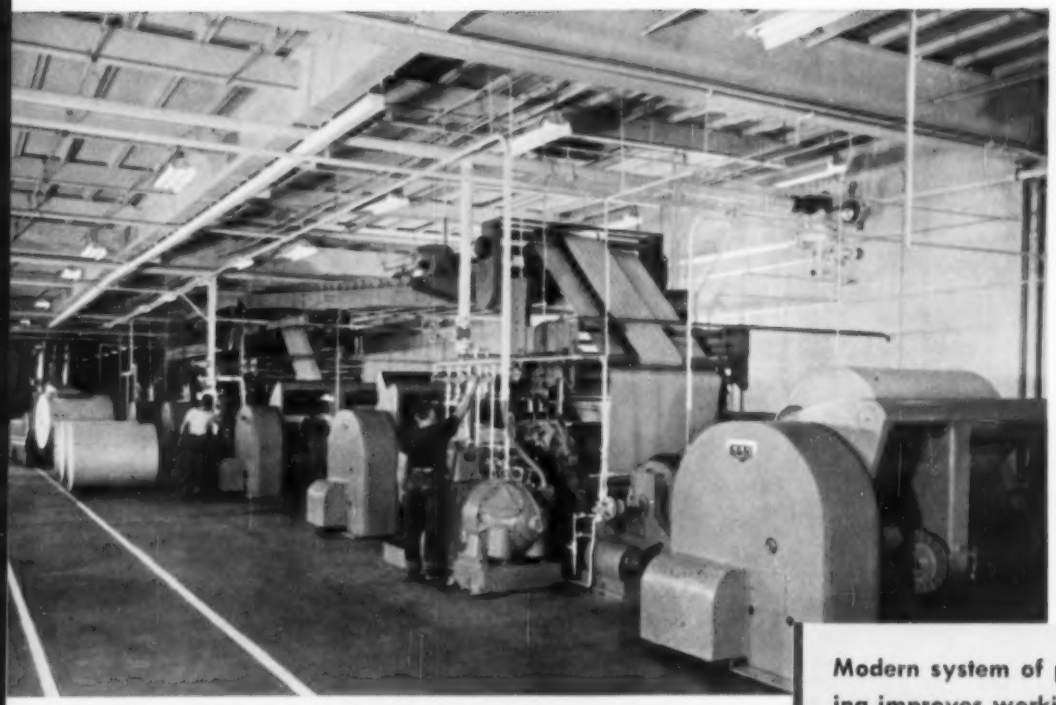
LIFTING DON'TS

1. **DON'T be a show-off. Do get help when you need it, or use a dolly, lift truck or conveyor.**
2. **DON'T use quick, jerking movements. They may cause injury by putting sudden strain on the muscles.**
3. **DON'T carry a load for long periods of time without frequent stops for rest.**
4. **DON'T carry load balanced on the hips. This bends the body to one side, throws you off balance. One arm gets all the strain.**
5. **DON'T lift with your legs straight, back bent.**
6. **DON'T move object directly from floor to shoulder height without intermediate rest stop.**
7. **DON'T twist around. Do get the load up and then shift your feet to turn your body.**

TIPS FOR THE TYPIST

1. **Rest your back and arm muscles at short but frequent intervals.**
2. **Vary your posture and movements often.**
3. **Exercise the muscles which get little activity on your job.**
4. **To relax, let your arms dangle, twist and shake them, stretch.**
5. **Make other muscles work each time you reach for more carbon or typing paper.**
6. **Sit straight, with your back supported by the chair, legs uncrossed and feet evenly placed on the floor.**

For a copy of booklet described on opposite page, use Key # B-12 on card on page 43.



Modern system of painting improves working conditions in Cleveland plant of Hankins Container Company, where 30,000,000 sq. ft. of corrugated board are processed monthly

Pittsburgh COLOR DYNAMICS®

increases efficiency in making shipping containers

FOR MORE THAN two years Pittsburgh COLOR DYNAMICS has been proving that planned use of color is a profitable investment for management and workers alike in the Cleveland plant of the Hankins Container Company. This modern structure was painted according to the principles of this modern system to improve productive efficiency and provide more cheerful surroundings.

The Hankins Container Company fabricates corrugated paper shipping cases and inner packing, packages for electric light bulbs, and paper containers of many types. Thirty million square feet of corrugated board are processed monthly.

Interior walls and ceilings of this plant are painted with morale-building colors of high reflectance value to make work areas brighter. Eye-rest colors on lower walls reduce eye strain. Machinery in focal and eye-rest colors enables operators to see their jobs better, Safety colors on operating controls, mobile equipment and traffic lanes reduce danger of accidents.

How COLOR DYNAMICS contributes to higher efficiency and morale is best expressed by R. A. Rabatsky, manufacturing vice-president:

"COLOR DYNAMICS has been helpful in providing our employees with more pleasant environment. By reducing eye fatigue we have increased their efficiency. This system of painting has also contributed to improved morale. Our people take pride in their surroundings and help to keep work areas clean and orderly. From every standpoint, COLOR DYNAMICS has been helpful in bettering our operation."

Why not investigate how this modern method of painting will improve efficiency, morale and safety in your plant? To paint with COLOR DYNAMICS costs no more than a conventional maintenance job.

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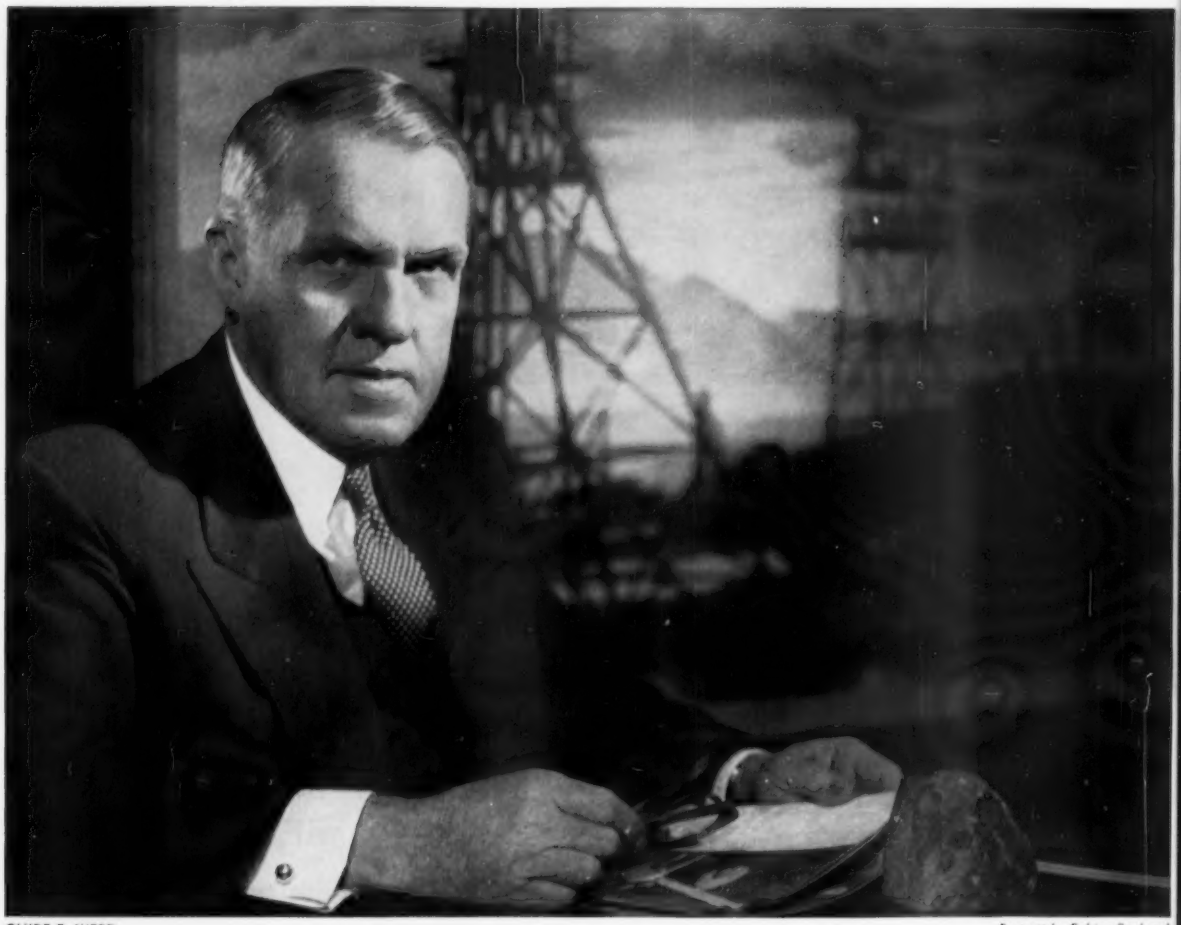

CLYDE E. WEED

Portrait by Fabian Bachrach

"22,514 Anaconda Employees Are Buying U. S. Savings Bonds

"In October, 1955, only 34% (11,140) of the nearly 33,000 Anaconda organization employees in this country were buying U. S. Savings Bonds through the Payroll Savings Plan.

"Late in 1955, we conducted a simple person-to-person canvass which put a Payroll Savings Application Blank in the hands of every employee. There was no pressure, no special promotion – just the Application Blank. Our employees did the rest.

"Recently, our records showed that 22,514 of our men and women–69% – are now Payroll Savers. Every new employee is given a Payroll Savings Application Blank and an opportunity to join with his fellow workers in building personal security through systematic thrift.

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CLYDE E. WEED, ***President***
The Anaconda Company

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SAFETY MAINTENANCE

there must be a better way

Sixty-two of the nation's foremost experts in keeping the nation's factories running led discussions at the 8th Plant Maintenance & Engineering Conference at Cleveland's Public Auditorium in January. The conference was held in conjunction with a record-breaking Plant Maintenance & Engineering Show during the first three of the four-day run of the show.

SM goes to

THE 8TH PLANT MAINTENANCE AND ENGINEERING CONFERENCE

The show, largest in its history occupied all available halls in the Auditorium and was one of the largest industrial expositions of the year in 1957. Executives from virtually all of the country's largest industrial firms attended the conferences and the exposition of maintenance products and equipment.

400 Exhibiting Companies

Maintenance procedures for every type of industry were described in the sessions, and thousands of products were demonstrated by 400 exhibiting companies. Many industries were given extra attention by the assignment of special conference sessions. Theme of this year's meeting was "Good Maintenance or Bad—The Difference Is Profit." Following are highlights from speeches given in various sessions of the conference.

● *Getting Maintenance People to Work as a Team*—Harold M. Sylvester, special assistant for maintenance, Office of Assistant Secretary of Defense, Washington, D.C.

The maintenance people of the Army, Navy, Air Force and the Department of Defense are definitely working as a team. The Real Property Maintenance Council is the means of a very frank exchange of ideas, methods and programs.

Getting teamwork in maintenance depends on: 1. Selecting the Right People (those interested in providing a service and in working with others to attain this end); 2. Assignment of Duties (they should be clearly defined at all levels, and day by day assignments should be clearly understood and measurable as to quantity, quality and efficiency); 3. Fixing Responsibility (a job can be broken down to its component parts, one of which is the over-all responsibility for coordination of the whole work); 4. Setting Up Standards (the standard,

in hours, finally determined for a given unit of work must be realistic and based on similar work, be a measure of time required by a worker of normal productivity working at a steady rate, and be identified as including or excluding necessary delays such as clean-up, personal needs, tools, etc.); 5. Communication between Supervisors and Maintenance Department Head (regular meetings to discuss actual progress, assignment of duties, planned workload, new developments); 6. Communication between Supervisors and Their Workers (similar to #5, but directed to the workers' viewpoint); 7. Fitting the Shop Stewards into the Picture (as advisors and adjusters for union workmen, stewards should try to resolve labor problems with supervision before taking them to the union for negotiation with top management); 8. Friendly Rivalry Among Units (contests, awards and other devices to develop friendly competition between production groups can be used in such areas as: meeting production schedules, accident prevention, improved methods or tools suggestions); 9. Giving Cost & Downtime Facts to Everyone who Can Influence Them (all levels of personnel like to know where they stand); 10. Bonuses (to stimulate interest and improve work; bonus systems can be lump sums based on over-all performance or can take the form of maintenance incentive plans).

● *Training & Education of Maintenance Personnel*—Ralph G. Smith, director, maintenance education, Dow Chemical Co., Midland, Mich.

One approach we use in the training of our engineers in maintenance is to have them spend time rotating throughout the shops, getting acquainted with the problems and personnel, assisting in expediting the work, etc. When a particular shop needs an engineer on its staff, one of these broadly trained engineers may then fill the job. In some cases, he is hired directly into one of the shops. There are also training programs for maintenance foremen and supervisors, determined to a large extent by their own needs.

For non-supervisory maintenance personnel, it must first be determined if a training program is needed because of unskilled workers available, new technical developments, a standard procedures program, etc. If the need is evident, then decide questions of selection of men, how many, performance standards, how training will be given, who is responsible, etc.

Maintenance Today

● *The Changing Requirements for Maintenance*—O. S. York, manager, maintenance engineering section, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

The cost for maintaining this country's industrial facilities increased 9 percent in 1956. While the growth of industry as a whole is responsible for some of this increased cost, its major significance may well be a reflection of the changing requirement in the entire maintenance problem. Factors involved in the change are changing employment patterns, advancing technology, new engineering materials, increased precision required in machining, automation, and effects on profits.

The difficulty of keeping the mechanical plant operating will become more and more the responsibility of the maintenance head. If the maintenance head is to accept and discharge this increasing responsibility, he must recognize four basic needs:

1. **Improved selection, training and upgrading of mechanics.** We have found the most effective training is obtained by a formalized program, tailor-made for each of our plant's particular requirements. This formalized training program, for experienced as well as new employees has given us: a. About 12 percent increased personnel effectiveness; b. Improved safety performance; and c. Smoother and faster start-up of new or expanded facilities.

2. **Improved tools and techniques,** to take the most effective advantage of the skills developed in the labor force and thus offset the increasing wage rates and labor-material ratio.

3. **Improved preventive and corrective maintenance techniques.** This must include a quantitative

FORECAST—Maintenance

A resume of the introductory address by L. C. Morrow, general chairman of the conference

1. The job maintenance must do is bigger than ever.

According to first-hand reports from manufacturing companies, expenditures for capital equipment in 1957 will be 14 percent above that for 1956. This means more equipment to be maintained in the future.

2. There are not enough people doing maintenance work.

More of the nation's skilled workers are employed in industrial maintenance work than in any other occupation, with the exception of the building trades. They total 9 million in the United States. 250 thousand replacements are required each year because of deaths, retirements and transfers; but only 100 thousand are available from training programs and immigration. There remains a shortage of 150 thousand maintenance workers each year.

3. The maintenance job is not being done as well as it should be.

A firm of consultants made a survey of 40 plants with maintenance costs ranging from $250 thousand to $1½ million annually. They found that:

analysis of repairs and failures, a summary of the over-all repair picture for the entire plant, and the development of an overhaul frequency and forecasting program.

4. Improved administrative control of maintenance work. The maintenance head must be able to determine the most effective improvement program and have a method of measuring the results.

● *Yardsticks for Measuring the Effectiveness of Maintenance*—Capt. R. S. Stewart (CEC), U. S. Navy, officer in charge, public works center, U. S. Naval Base, Norfolk, Va.

In our maintenance efforts, yardsticks have been developed for measuring such elements as total maintenance cost, productivity of maintenance personnel, and the effectiveness of the maintenance program. To use yardsticks effectively we must have accurate records. The numerical value for these standards may vary over a wide range even within the same industry. Such variables as the age and make of tools, equipment, and facilities and the climate will have a marked effect upon the value of standards. Yardsticks should be developed for just your plant and their units, and should reflect those most easily applied and understood by your management personnel from the line supervisor to top management.

The purpose of yardsticks is to keep our expenditures in line, and much of the initial reduction in maintenance costs results from the information revealed as the yardsticks are developed. For instance, in our vehicle maintenance program our yardsticks are direct labor hours, overhead labor hours and material dollar per 1000 miles. Of the $14 million annual savings realized by this program, about $10 million was from improved planning and scheduling methods, $2 million from reductions in overhead labor, and $2 million from increased production. A similar pattern has appeared in the maintenance of our buildings and other facilities.

Will Boom, If . . .

a. Every plant was handicapped by the lack of trained maintenance engineers. Only one had a man with formal engineering training in charge of maintenance.

b. In 85 percent of the cases, budgeting of maintenance expenditures was non-existent or ineffective.

c. In all but two cases, construction and repair contracts were given out without competitive bids. In 50 percent, purchase orders were issued AFTER the work had been done.

d. 75 percent of the plants had no effective storeroom record system.

e. In four out of five plants, maintenance employees were idle 20 percent of the time.

f. In 60 percent of the plants, maintenance supervisors and foremen were less effective than corresponding foremen in production departments.

Is this picture of maintenance inefficiency true on a nationwide scale? It may well be. Even if it is not, the situation is serious. On the brighter side, maintenance has made great progress in the past eight years. The point is: *it must go further.* Actually, most of the shortcomings must be made up by the joint action of management and maintenance. Both must concern themselves with items like budgeting, storeroom systems, contract policies, training, and cost control. Then it will be easier for maintenance to go ahead with those steps it must take by itself.

● *Maintenance Cost Controls*—Edmund C. Newton, administrative assistant, mechanical department, Point Breeze Refinery, Atlantic Refining Co., Philadelphia, Pa.

In 1950 a program was started by our maintenance department and is proving very effective in improving manpower utilization and reducing work costs. The program progressed along several essential lines: **1. Standardization of Work Methods** (standards were set up by an industrial engineer working with experienced foremen in each craft); **2. Training of Supervisors & Craftsmen** (the standard practice instruction manual was used in training foremen and upgrading of mechanics); **3. Development of Engineered Planning Times** (engineered times for specific jobs were set up by the industrial engineer and supervisors and field tested in actual operations); **4. Improvement on Planning & Scheduling** (to take care of routine maintenance jobs, turnarounds, authorization work, and to maintain work control); **5. Packaging of Larger Elements of Work** (putting larger elements of repetitive work on a packaged basis reduces costs and includes daily work reports so that manpower can be shifted as needed).

● *Equipment Replacement Policies*—Raymon I. Reul, staff industrial engineer, chemicals division, Food Machinery & Chemical Corp., New York.

The question of replacing obsolete, inefficient or expensive-to-maintain equipment must be decided on the basis of just the specific investment and not on the business as a whole. To keep investment evaluations meaningful: 1. Establish the present time as a baseline and consider only new factors that you predict will occur in the future. Book values of previous investments are irrelevant to new investments and should not be included as a factor in their evaluation. 2. Establish "doing nothing" as one alternative. This is a possible choice and it is also useful for comparison with the proposed action. 3. Include all expenditures related to the project and all income received during the life of the project. Set up all cash movements exactly as you predict they will occur. 4. Use depreciation only

as a deduction which reduces income taxes payable. Except for its effect on Federal income tax payments, depreciation has no place in investment evaluations.

● *Maintenance of Equipment Standards*—Herald A. Burns, manager, production engineering department and shops, Ansco Div., General Aniline & Film Corp., Binghamton, N. Y.

While the number and types of standards for equipment used in manufacturing plants vary according to the structures, production equipment and processes, and the nature of the final product, every plant needs some standards. A good standards program should include: 1. A competent Standards Engineer; 2. An active Standards Books that is kept up to date; 3. A Stock Book to be used by the Design Department; and 4. An adequate, active stock in Mechanical Stores. To reap the full benefit of such a program, the Standards Book must be kept active to take advantage of new technological improvements, and it is the duty of the Management of the Engineering Department to enforce judiciously the following of the standards.

Maintenance Techniques

● *Painting*—Joseph Bigos, director of research, Steel Structures Painting Council, Pittsburgh, Pa.

All painting is a compromise between the ideal of no painting and the optimum painting. The compromise, dictated by local conditions, should be the economical solution.

In some plants, out-of-face painting works best. This scheme repaints on a schedule and includes everything in a given area. The reduction in painting cost by this concentrated effort, as during a shutdown or vacation, may offset any losses by painting some items too late or too soon. The key to success in this method is a careful inspection to show which elements will require only a washdown and single finish coat and which will require a more complete job.

The other method of painting is to coat when necessary. Here, the critical factor is whether the painting is primarily for protection or for appearance. In the former, painters should achieve the minimum coverage in square feet per gallon of paint. In decorative painting, they should get the maximum coverage in square feet per gallon.

In painting ferrous metals, it is imperative that rust be removed down to sound metal before painting. By using slow drying primers with good wetting power, it is possible to paint over slight residues of rust. Steel which has been weathered to remove mill scale should then be sandblasted. Paint failures can also be reduced by various pretreatments of the steel, such as: phosphate treatments, and wash-primer pretreatments of galvanized metal. If badly cracked or broken mill scale cannot be removed, a wetting-oil pretreatment is advantageous.

The selection of specific paints for specific purposes depends on particular plant conditions. For steel structures, incidental steel work and steel equipment, a choice can be made from: oil-base paints (for normal exterior and interior work); alkyd paints (for severe weather exposure and corrosive interior work); phenolic paints (for fresh water immersion, high humidity, moderately severe chemical atmospheres, and in some cases, salt water); chemically resistant paints (for water immersion, severe chemical atmospheres, high humidity); rust preventive compounds (⅛ inch thick coatings for long term protection in inaccessible places or short term protection in corrosive areas); bituminous coatings (for severe chemical atmospheres and some types for immersion and underground uses).

● *Maintenance Welding*—Vincent J. Richilano, assistant superintendent, methods & maintenance, Cleveland Ordnance plant, Cadillac Motor Car Div., General Motors Corp., Cleveland, Ohio.

We can classify maintenance into three main categories:

1. Repair Welding of Machinery, Equipment & Buildings—material usually is grey cast iron, mehanite, cast steels, low and high alloy steels, brass, bronze, or aluminum. Points to consider: a. Determine the dimensional stability required during welding and after; b. Determine the welding process best suited for the repair; c. Select proper electrodes and other materials; d. Prepare weld joint properly and be sure there is good base metal; e. Select an experienced operator and instruct him on the procedure.

2. New & Replacement Items, Fabricated by Welding, for Machinery, Equipment & Buildings. The use of welding for such fabrication is fast and economical. Examples of equipment made by welding in our plant include: machinery guards, processing tanks, heating system ducts, airline piping, roof ventilators, underground pipes.

3. Special Applications of Welding. Inert gas shielded arc welding is a rather limited type of repair welding today, but many plants can take advantage of it for special applications. It permits welding on a wide variety of metals, it gives a molten metal completely protected from atmospheric contamination, and it can be used for repair of aluminum housings on tools, corrosion resistant steels, hard surfacing, etc.

● *Role of Lubrication in Preventive Maintenance*—J. R. Hicks, headquarters staff engineer, Socony Mobile Oil Co., Inc., representing the American Petroleum Institute.

Lubrication has a tremendous effect on production and on maintenance costs and, therefore, is an integral part of any preventive maintenance program. What may not be fully appreciated is that the costs of machine maintenance can be reduced 10 to 25 percent and more by establishing correct lubrication practices.

To set up a good lubrication program, the plant should be studied by a group including an experienced lubrication engineer and representatives from maintenance, production, cost accounting, purchasing and personnel. The man who heads the program should be thoroughly familiar with lubricants and their application and with other phases of machine maintenance. Get assistance too from your oil supplier, by asking him to provide you with the services of an experienced lubrication engineer. Set up a program that covers selection of lubricants and records for individual machines, oiling schedules, handling and storing facilities, employee training, purification methods, etc. In some plants, the machine operators oil

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their own machines, while in others trained oilers will be more satisfactory.

● *Maintenance of Electrical Rotating Equipment*—Arthur E. Goodwin, superintendent of development, motor and control division, Westinghouse Electric Corp., Buffalo, N. Y.

The failure or shortened life of most electrical apparatus is generally caused or contributed to by six different factors, aside from normal wear of moving parts: Vibration, Dirt, Moisture, Insulation Weakness, Ineffective Lubrication, or Mis-application. Electrical equipment manufacturers have made great progress in minimizing these causes of maintenance in the basic design of the apparatus, such as impregnating compounds that bind wires together, better mountings, proper enclosures and treatments of parts, anti-friction bearings and greases.

In our plant, some of our electrical people are specialists in various types of motor repair and maintenance. In addition, motors and generators are blown out or cleaned from once a week to once in four months, depending on the location; automatic controls, such as recording instruments, are checked and repaired by our meter laboratory; on electronic controls, we clean the control box and relay contacts, and replace tubes when necessary; on non-electronic controls, we tighten connections and clean and adjust contacts about every four months, or once a month on automated equipment; normal power lines or feeders are checked for grounds once a year during downtime.

● *Maintaining Electrical Distribution Equipment*—H. E. Heddesheimer, consultant, electrical engineering, General Electric Co., Schenectady, N. Y.

Continuity of electrical service in industrial operations today is no longer important—it's imperative.

Some components of an electrical distribution system require only occasional preventive maintenance, and consequently, all too frequently, receive absolutely no attention at all: **Capacitators** (periodically check for blown out fuses; keep capacitators clean and well ventilated; do not operate at any sustained voltage in excess of 10 percent of the unit's rating); **High Voltage Bushings** (clean the porcelain every six months; hone chipped places smooth and paint with a good sealer; replace fractured porcelain; refinish and seal any chipped surface of the cement; clean, prime and repaint corroded metal parts; check oil level and test for dielectric strength); **Cable** (visually inspect for overloads, poor thermal conditions, mechanical damage and inherent danger spots; take initial megohmmeter readings; record readings; analyze subsequent readings based on previous records; when the insulation resistance is deteriorating rapidly, make plans for replacement during a shutdown); **Transformers** (once a month check load, voltage, temperature and coolant level; see that dry-type transformers are not subject to wetting, and inspect internally every year, cleaning if necessary); **Protective Relays** (normally inspect thoroughly once a year for corrosion, missing covers, broken glass and accumulation of dust inside the housing, and have their electrical characteristics and settings checked by your utility service if you do not have trained personnel or equipment).

HARD HAT SAVES SKULL: Hard hats save many Ohio employees from serious injuries. Carl Paxton, who works for the Ohio Power Company at Steubenville, knows this well. Paxton recently was picking up scrap wire near the base of a 35-foot pole. A lineman at the top was using a 12-inch crescent wrench to remove a rusty screw. The wrench slipped and struck Paxton on the head. His hard hat was knocked to the ground and he was dazed for a moment or two, but uninjured. Paxton, the protective hat and the wrench are shown above.

● *Maintaining Handling Equipment*—John Bayuk, plant engineer, Lycoming div., Avco Mfg. Corp., Stratford, Conn.

The life line of any industrial plant is the flow of materials through processing from the rough state to the finished product. Mobile handling equipment must have the same preventive maintenance as production equipment.

The powered industrial truck should have a monthly lubrication, inspection and servicing and a major inspection and service every six months. The operator should also fill out a daily service report. In our plant, gas trucks go through a major overhaul every 3 to 5 years. The work is contracted to an authorized factory service.

We find that roller conveyers require about a quarterly inspection, but those in foundries may need daily inspection. We check belt conveyors every week for wear, belt tension, and the condition of the drive motor. Continuous running monorails are checked weekly,

lubricating the trolley wheels and checking the track alignment as well as the motor drive.

Production cranes, up to 1 ton capacity, are checked and lubricated monthly. Large service cranes are inspected every three months, but are lubricated and hoist-cable checked every month.

● *Sanitation—Floors, Windows & Washrooms*—Ralph W. Woida, department superintendent, building maintenance department, Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Factors determining the best method of floor maintenance include: the types of floors involved and the soil condition involved, and why, how, when and who will maintain them. These same general questions should be applied in selecting cleaning tools, equipment and materials.

Window maintenance is a never-ending chore and can become an expensive luxury. Use an analytical approach to the program: 1. Are the windows for light or ventilation? 2. Were they installed for budget reasons at the time of building erection? 3. Is lighting adequate without full window light? 4. How often are they now cleaned? 5. Can frequency be reduced without adding lighting expense?

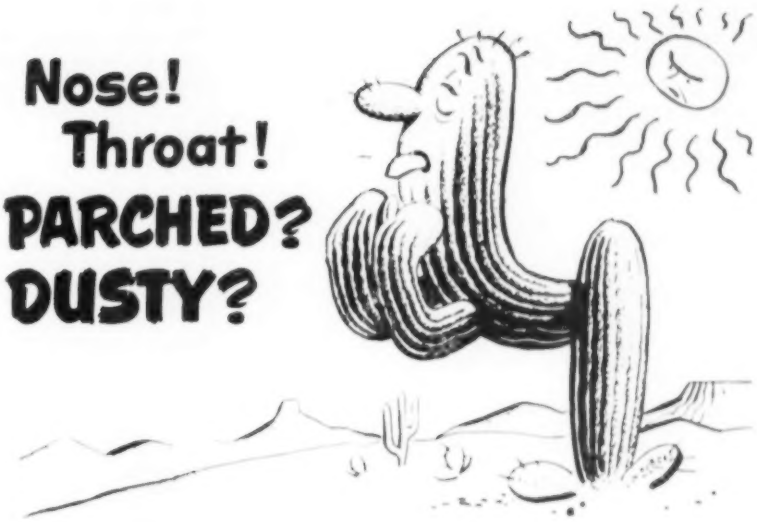
Although washroom maintenance is vital in retaining continued good health for employees and the public, it should also be performed to prolong the life of the facilities. Daily cleaning of floors and fixtures should be mandatory. Use care in selecting tools and supplies. Some cleaners are too strong and may eventually harm the floor, fixtures or plumbing.

In a large organization, specialization of work assignments gives better control of personnel. In our company, sanitation duties are assigned for: Shop Cleaning, Washroom Cleaning, Office Cleaning, Floor & Furniture Cleaning, and Pit & Machine Cleaning.

● *Maintenance in Small Plants*—William C. Wallin, chief, plant engineering department, North Carolina Works, Western Electric Co., Inc., Winston-Salem, N. C.

Even in plants with less than 50 maintenance employees, it is still true that preventive maintenance is productive maintenance. Management methods and controls devised for production operations must also be applied to maintenance. There are opportunities for cost reduction: 1. Study the relative advantages of centralized versus zone maintenance as applied to your specific plant conditions; 2. Planning the work of the maintenance craftsmen and crews will improve man and machine effectiveness; 3. Study the property, machinery and equipment so that breakdowns can be anticipated by means of scheduled inspections and lubrications, and timely minor repairs; 4. Keep adequate time and material-usage reports for sound accounting, with timekeeping centralized as much as possible; 5. If incentives are desirable, time standards for controls will be required; 6. Certain control reports must be established to show the degree of effectiveness of the work; 7. Set up an adequate spare parts and material control program; 8.

Nose! Throat! PARCHED? DUSTY?



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Set up a maintenance control plan, with emphasis on preventive maintenance; 9. An adequate and clearly defined organization should conduct all phases of plant engineering and maintenance; 10. It is suggested that a study be made of the suitability of tools and the possible use of pre-assembled kits of materials, and that job conditions be investigated for improved methods.

Case Histories

● *Planning and Scheduling*—C. A. Monson, staff specialist, mechanical methods and planning, Procter & Gamble Co., Cincinnati, Ohio.

Although our factories vary somewhat, a typical facility would be a chemical plant employing about 600. Maintenance is the responsibility of the plant engineer, who is also responsible for minor construction, plant protection, utilities and technical services. About ¼ of the employees are under his direction.

For maintenance, the factory is divided into zones with a maintenance foreman and mechanical crew assigned to each zone. The foreman and his assigned job-estimate engineer plan and schedule the maintenance work. The engineer draws up a step-by-step job plan with estimated times. Once a week, the department foreman, zone maintenance foreman and engineer review the current schedule. The typed schedules also serve as time sheets by the men to record their actual job time.

To measure the effectiveness of our planning, the engineer makes a field study of the job by observation. It is not a measure of worker effectiveness but how effective the managers were in planning to eliminate delays. This study will show the causes of delay (the need for a specific type of tool, skilled craftsman, etc.) and the actual time required for job elements. The time sheets are forwarded to the maintenance cost control engineer.

● *Maintenance Organization*—Edward W. Sutton, maintenance superintendent, Westvaco Chemical Div., Food Machinery & Chemical Corp., South Charleston, W. Va.

This is the story of a Maintenance Department of some 65 hourly craftsmen, five foremen, and one supervisor. We also have two Maintenance Engineers and two clerks. In charge of this organization is the Maintenance Superintendent who reports to the Plant Manager. Total plant employment is 350, with 25 percent in supervisory, technical and office work. The total maintenance bill is about $450 thousand, plus some $50 thousand for work charged to our capital account.

The maintenance organization is divided into three major groups:

1. The line organization, consisting of the maintenance craftsmen, their foremen, and the supervisor. We have five foremen for some 60 craftsmen and they are the backbone of the department. They schedule and assign work to men

"I AM wearin' 'em, Stoopid!"

in a specialized craft or small group of varied crafts, and are responsible for safety, housekeeping, training and other management functions. In our training program, they rate their trainees in job performance every week and give special attention to those requiring it. The Maintenance Supervisor, who reports directly to the Maintenance Superintendent, coordinates the foremen. The supervisor's main function is to develop better foremen and holds weekly meetings with them.

2. The staff organization, consisting of maintenance engineers. Their function is to reduce costs and increase plant productivity through planned engineered maintenance. Their sources of cost information are a cost history card kept on every major piece of equipment and the records of all equipment breakdowns. They are also responsible for the buildings and grounds and may have specialized duties as well, such as lubrication, protective coatings.

3. The clerical organization, which reports to the Maintenance Engineering Section. Their work involves the handling of work orders, repair history records, charting maintenance costs, etc.

The Maintenance Superintendent issues a monthly report to the Plant Manager on workload, equipment failures, maintenance engineering, idle equipment, construction & major repairs, personnel, plant visits, labor relations, fire department, and powerhouse. Another report reviews maintenance costs for the plant and the department.

● *Central Maintenance Shop*—Arnold R. Jones, assistant superintendent, mechanical construction and maintenance department, Norton Co., Worcester, Mass.

The way we treat our maintenance shops is affected by the nature of our product and the physical location of the plant. Our product involves abrasive materials. Our plant has about 3 million square feet of floor area in both multi- and single-story buildings extending over an area one mile long and ½-mile wide. Our kilns operate around the clock, many of our manufacturing mills are continuous systems and much of the equipment is interconnected.

The maintenance shops are now located in four separate buildings. Three are adjoining and house our conveyor repair, electrical, piping, carpenter and paint departments. Across the street is our factory service building, which houses our machine shop, heat treating, welding, sheet metal, machine assembly, equipment repair and mason departments.

However, we have just poured the foundation for a new Central Services Building which will house all shops and crafts under one roof. It is 80 feet away from the present factory service building which will be converted to a storehouse. The new building is centrally located in respect to all our production departments.

Our reasons for having all departments under one roof are to provide more feeling of a common objective among the maintenance men, to coordinate the actual repair efforts, and to eliminate duplication of costly equipment.

Except for emergency work, we try to schedule most repair work for the daytime. Shutdowns in our continuous equipment are held every one, two or three weeks, depending on the process and number of shifts worked.

The new building is laid out so that chip making operations are together and next to the heat treating facilities. The welding shop and the paint shop have the only permanent partitions in the work areas, and the latter is located near the carpenter shop and the sheet metal department. Small shop offices are provided for foremen.

Lighting is by means of eight-foot continuous-row fluorescent lights, hung at 16 feet above the floor. The building will have concrete floors with a hardened surface and possibly wooden floors in the carpentry shop.

● *Preventive Maintenance*—Fred M. Gross, superintendent of maintenance, Ashland Works, Armco Steel Corp., Ashland, Ky.

Faced with the fact that 90 percent of the work done in finishing a product is done by machine, we must think of maintenance as the most effective means of keeping the plant machinery in continued production. Maintenance programs must be developed around a sound, well planned, and closely supervised "Preventive Maintenance" nucleus. It must begin with the original design of the equipment, and we use a "Maintenance Materials Manual" and "Maintenance Helps" record book which are supplemented by inserts with additions or changes.

Suggestion System Program

To supplement the services of the Maintenance Engineer, we have a suggestion system program and a methods improvement program. A well balanced training program is also essential, including a sound apprentice program, class-room training and evening off-hours classes.

The basic organization of a preventive maintenance program must include facilities flexible enough to cover all conditions and equipment. It should include planned inspections, follow-up of inspections, spare parts, materials control, materials research, and a staff of mechanical, electrical and lubricating advisors.

An illustration of what preventive maintenance can do is shown in our appointment of an inspector to investigate the operational delays in our open hearth department, where 438 hours had been lost to unplanned maintenance. His report showed delays of from 10 to 35 minutes for installing new door frames in the furnaces. A new type of door frame was the answer. Also revealed were delays from breakage of charging machine rails and failure in the bridging equipment.

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These failures were caused by a general weakening of the floor supports. The floor structure was strengthened in the program that followed. Many other improvements resulted from the report, and the delays dropped to 128 hours and to still lower figures in subsequent years.

Maintenance in Specific Industries

● *Textile Mills*—R. V. Ott, maintenance engineer, Celanese Corp. of America, Narrows, Va.

Although the plant capacity of our company's Celco plant has increased since 1950, maintenance labor has been reduced 50 percent; and although the plant operates 24 hours a day, every day in the year, shift maintenance has been reduced more than 60 percent. These results were accomplished by a long range plan with seven basic controls: 1. Organization, 2. Work and Labor, 3. Preventive Maintenance, 4. Corrective Maintenance, 5. Training, 6. Materials, 7. Safety.

● *Rubber Mills*—Richard T. Wise, engineering manager, Akron tire plant, B. F. Goodrich Tire Co., Akron, Ohio.

Some of the special problems of a rubber plant are:

Banbury Mixers—Every two hours the oiler checks the grease and oil reservoirs, bearing temperature, jack-shaft-bearings temperature and oil level, bull gear and motor bearings oil level. Clearance checks are made every six months. The long rotor bearing on the drive side has an automatic alarm if the temperature reaches 150 F.

Mill Lines—Roll failures, plus tests to measure power consumption used in various methods of loading cold stock onto the mill, show that mills used for warming cold stock are subjected to very severe working conditions. We have set up prescribed loading procedures during the initial start-up and on successive batches. To prevent failures of the first section of the mill line shaft, it is necessary to have a bearing between the first pinion and the coupling. Improvements are needed in the high speed section of the gear reduction units.

Calenders—The four-roll calender producing tire fabric is a critical item of equipment. It is given careful attention by a resident mechanic, electrician and oiler. The main troubles involve roll bearings, stock guides, and roll adjusting mechanism.

Curing Equipment—Pot heaters require frequent replacing of ram packing. We believe the chief cause is the rough surface on many of the rams and we are now machining and metal-spraying these rams. Steam dome presses cause little trouble. We replace the dome gasket about once a month. Each of the makes of the other presses has certain advantages and disadvantages. The manufacturers state that their new models solve some of the problems we have encountered.

Other Equipment—There are several types of tire building machines, each with its own problems. Tube machines cause little trouble, but barrel life of older models has been lengthened by using hardened steel sleeves to replace cast iron or meehanite sleeves.

Electrical Equipment—Electrical maintenance is the most important single phase of rubber plant maintenance. It must include regular inspection procedures: correction of defects found; attention to proper adjustment, settings and calibration of relays, contacts, and metering instruments; adequate spare parts; and equipment records.

● *Petroleum Refineries*—Bert E. Newton, maintenance engineer, Ohio Oil Co., Robinson, Ill.

Ours is a medium sized plant, employing about 750 persons, of whom 225 are in maintenance. Except for emergency jobs, a Work Order is required, originated by a foreman, engineer or operator and approved by the superintendent. Emergency work is handled directly from the scheduling and planning office. Routine maintenance work is covered by Re-Occuring Work Orders.

Our tool manual speeds up jobs 10 to 15 percent by showing what tools are required for the repair of any piece of equipment. The scheduling office can call the tool room to have all the tools ready for a specific emergency job.

We follow the same procedures for turnarounds on both large and small units. In planning it, we start with the total man-hours and cost figures of the last turnaround and decide what repairs, additions or changes will be made in the facilities. Basic crews consist of a gang leader and two helpers. We do a moderate amount of chemical cleaning during the turnaround with considerable success and we hope to extend this. Approval to do blinding or to open any equipment must be obtained from the turnaround office. Maintenance then does its work as listed and gets approvals from metal inspection and operations before the equipment is final steam- and hydrostatic-tested.

We keep equipment records on all major pieces of mechanical and process equipment and hope to extend this to show repair costs and replacement.

Corrosion is a big problem. The metallurgy department examines all equipment for signs of corrosion, erosion, fatigue, etc. Good painting practices are essential, but no one system nor one paint is suitable for an entire refinery.

● *Paper Mills & Products Plants*—R. E. Johnson, plant engineer, Albemarle Paper Mfg. Co., Richmond, Va.

Routine maintenance and repair work is carried out by the Master Mechanics and Chief Electricians. We try to schedule wire changes a couple of days in advance. One-week shutdowns, twice a year, permit time for major repairs and inspections of major units and improvement projects that require downtime.

Our company has set up a long-term capital improvements budget that extends three years and is of great help in our scheduling.

● *Continuous Operations Plants*—Joseph B. Littler, plant engineer, Durez Plastics Div., Hooker Electrochemical Co., No. Tonawanda, N. Y.

One of our biggest maintenance problems is our continuous production phenol plant. The operating equipment is housed in 18 buildings and starting and shutting down large groups of interconnected equipment is difficult and costly. We have two shutdowns per year and schedule as much inspection and repair work as possible for these periods. In addition to our 48-man mechanical force, we use

more than that figure from outside contractors to speed the work.

Although we can often make temporary repairs without a complete shutdown, we do have emergencies that require this action. Last year there were nine shutdowns from power failures and two from equipment failures. The former is especially annoying and is the result of our antiquated supply system which we are planning to modernize. Keeping the plant running also requires continual observation by the operating personnel. The hardest problem is a leaking gasket, cracked valve or split porcelain. We can sometimes tape it, by-pass it, or temporarily shut off the line.

We were never successful in finding a method to prevent fouling of the blower. Both in time and money, we were wise three years ago to install a standby blower. We also have standby units for exhausters, acid evaporators, and first-stage catalytic chambers. Not all equipment that might fail within six months is duplicated because of improved materials and designs, such as low-alloy and stainless steels, higher-duty fire brick.

● ***Metal Fabricating Plants*—Robert A. Melton, divisional plant engineer, stamping division, Chrysler Corp., Detroit, Mich.**

We have about 18 thousand motors and burn out about 470 motors per year. The electrical departments do minor repairs and our Motor Winding Department rewinds most motors up to 7½ H.P. Other motors are repaired by contractors. Each plant keeps spare motors, but any motor beyond that plant's maintenance requirements is put in a surplus motor pool. Before purchasing a new motor, a plant has to check with the pool to see if the required type is there.

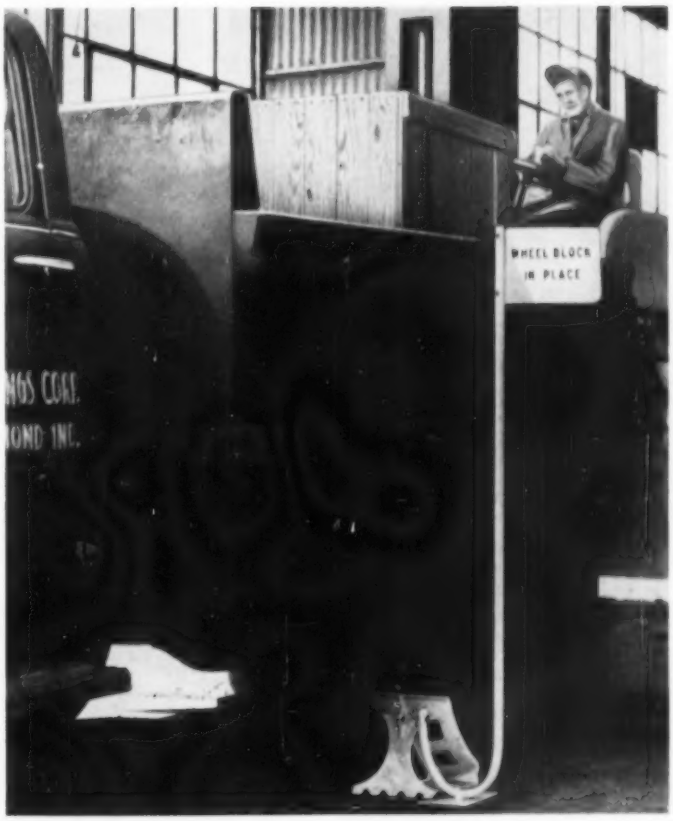
In converting to peace-time production after the war, we had from two to five presses down daily for clutch and brake overhaul. We tried converting some of the old single or multiple disc mechanical clutches to air-operated types. They were so successful that we have now converted many of our presses, resulting in lower maintenance costs and better die setting.

We have an ultrasonic tester mounted on a hand truck. With it we can check our presses for flaws and fatigue cracks in shafts and other stressed parts that are accessible. Among 75 presses, we located 35 defects. We believe that ultrasonic inspection of new parts, discovery of the need for a major overhaul before complete breakdown, and complete inspection of stressed parts during any overhaul are saving dollars, making sense.

(Continued on page 74)

Safety Maintenance SALUTES

A SAFETY IDEA



Attach Sign to Truck Wheel Block

Suggested by the Calumet Steel Castings Corp. is the addition of a sign post to safety wheel blocks to show to lift truck operators whether the block is in place during loading dock operations. A vertical standard may be attached to heavy-duty blocks with a short connecting arm and base plate, so that a double-faced sign many be fastened at the top to be visible both to the driver of the truck and the operator of the lift truck. When the block is in proper holding position next to the tire, the sign will indicate that the truck is anchored. But if the sign is out of place, it will show that conditions are unsafe for loading.

Picture by courtesy of Calumet Steel Castings Corp.

HYDRAULIC DUMPER

A new Tubar twin cylinder hydraulic dumper has been introduced by the Tubar Dumper Division of Uhrden, Inc. Designed to elevate loads up to 2,000 pounds at heights up to 60 inches, the dumper is said to combine ruggedness, stability and ease of operation with positive safety features.

Highly portable, the electric motor-driven dumper utilizes a 12-volt battery or conventional power

line as a source of electricity. Splash proof and explosion proof power features are available on order. According to the manufacturer, the unit will help to reduce handling costs and accident hazards in industrial operations. Available for a wide range of applications, it is adaptable for dumping drums, vat boxes, box trucks and specially shaped containers.

For details, use Key **# MH-1** on Inquiry Card on page 43.

PALLETLESS LOADS ATTACHMENT

An industrial truck attachment capable of carrying and stacking variously patterned loads of different size cartons without pallets has been announced by the Automatic Transportation Company. The outstanding feature of the new Schmidgall attachment is said to be its versatility. The attachment is not restricted to a single pattern of voids, or empty spaces in the bottom row of cartons into which the forks are inserted. The adjustable outer forks may be moved horizontally to accommodate varying load widths, patterns, and carton sizes. Power-actuated clamps on the sides of the forks grip the sides of the lowest row of cartons. Because power actuated, vertically rising bars run the length of all three forks and rise to support the bottoms of the second level of cartons in the load, the horizontal clamp can grip the lower level cartons near the bottom, their strongest area, thus preventing damage to cartons through clamping pressure.

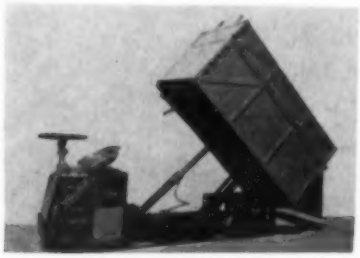
The new carton-handling attachment does not require strapping or gluing of cartons. In the accompanying photograph, the device is mounted on a model BF-40 electric-driven industrial truck.

For details, use Key **# MH-2** on Inquiry Card on page 43.

MATERIALS HANDLING DEVELOPMENTS

IN-PLANT DUMP TRUCK

In answer to the problem of trash collection in large plants, the Materials Handling Div., American Pulley Co., has designed the Loadmobile Dump Truck. The truck has a hydraulically tilted dump body with a capacity of approximately 2½ cubic yards. Hinged



sides enable the operators to load the truck easily and provide additional space for greater loads when necessary. A 45 degree incline at full tilted position allows the refuse to slide out easily through the large opening made by the end gate. Releasing mechanism is located at the front of the body, permitting control either by the driver, or, when the body is tilted, by one of the operators.

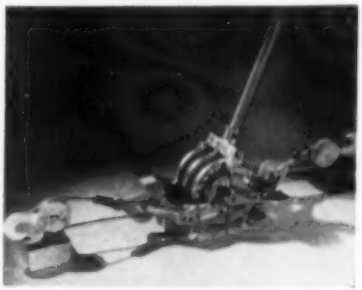
Two operators may ride safely on folding steps on each side of the driver, simplifying pickups from either side of aisles. With a body length of 6¾ feet and a width of just over three feet, the truck is maneuverable in narrow aisles. Rated capacity is 1000 lbs. for refuse, although the truck can handle three times that in other commodities. Over-all length is 9 feet, 8 inches. The unit is battery powered.

For details, use Key # MH-3 on Inquiry Card on page 43.

HEAVY DUTY HAND WINCH

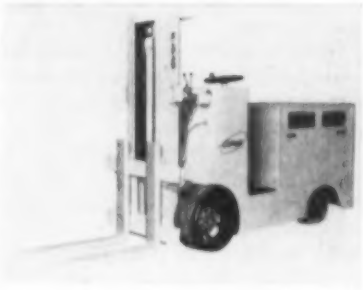
A heavy-duty, manually-operated power tool designed to lift, lower and pull, has been developed by the Multiple Corp. Serving many needs, it can be used to move heavy machinery, load or unload equipment from platforms, vehicles, etc., lift elevators in need of repair, pull vehicles from ditches, etc. The lightweight cable unit, which in many instances can be operated by one man, is available in several models. The single reel unit pulls in one direction only, and has a maximum reel capacity of 100 ft. The double reel unit pulls in two directions at one time, and its maximum capacity is 50 ft. on each reel.

A self-contained brake is provided for the reels with standard cable equipment consisting of 30



ft. of ¼ in. cable. Cable capacity is 7,000 lbs., single line. Safety features include a formed steel safety catch to prevent accidental release of the load. Application of the reel brake provides added protection against accidental load release. The units, known as Multi-Pul, are recommended for plant maintenance, warehouses, mining companies, contractors, etc.

For details, use Key # MH-4 on Inquiry Card on page 43.



10,000 LB. CAPACITY FORK TRUCK

A new electric-powered, stand-up, center control fork truck, with a capacity of 10,000 lbs., has been announced by The Elwell-Parker Electric Company. The new model, designated R10T, features front wheel drive, rear wheel steer, and has a travel speed of 4.5 MPH without load, 4 MPH with a full load.

Other features of the truck include contactor control with automatic acceleration; four speeds forward and reverse. Direction and acceleration are through a single hand control lever. The frame is of heavy gauge reinforced formed steel plates electrically welded into a rigid box structure.

For details, use Key # MH-5 on Inquiry Card on page 43.

PORTABLE LOADING PLATFORM

Magline Inc. has introduced a portable magnesium platform table to be used in conjunction with a

Magliner mobile loading ramp permitting parallel loading of rail cars where track-side space is limited. The platform is ruggedly constructed of light weight magnesium and measures 8 x 8 feet. It can be positioned by a lift truck at the car door opening. The mobile loading ramp is then locked in place at the side of the platform parallel to the track. A Magliner dock board can be used to bridge the gap between platform floor and car entrance.

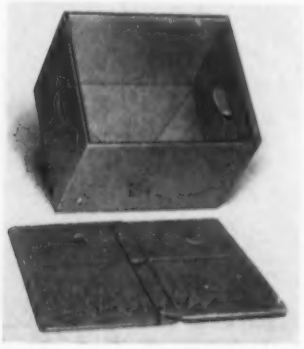
Edges of the platform deck are equipped with patented safety-curbs to prevent power truck run-off and eliminate tire damage. Safety curbs are removable, permitting parallel loading from either side of rail car. Special diamond-tread, reinforced floor plate assures safe traction on platform. Engineered for load capacities up to 16,000 lbs.

For details, use Key **# MH-6** on Inquiry Card on page 43.

COLLAPSIBLE TOTE BOX

The Paige Company has introduced a spacesaving tote box which automatically pops open for use and pulls flat for storage. Known as the Miracle Tote Box, it is made of heavy-duty, double-walled corrugated cardboard, said to give it high load capacities as well as stacking strength—in excess of 500 lbs.

Available in two sizes, 17x13x 14½ inches, and 15x12x10 inches, the tote boxes are supplied with covers for dust free storage of parts, plant records, etc. According to the manufacturer, the boxes can be collapsed 100 or more times without showing signs of wear. Heavy gauge polyethylene liners are available for use with wet, oily or greasy materials.



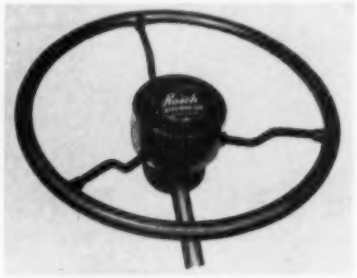
For details, use Key **# MH-7** on Inquiry Card on page 43.

LIFT TRUCK FOR HAZARDOUS LOCATIONS

The Yale & Towne Mfg. Co. has announced the development of a line of gas powered industrial lift trucks for use in hazardous locations. The trucks carry the approval of the Underwriters' Laboratories for Class I, Division II (Hazardous gases and liquids, such as gasoline, naphtha, alcohol, etc.), Class II, Division II (Hazardous dusts, such as coke dust, metal dust, carbon black, etc.), and Class III, Division II (Combustible fibers, such as rayon, cotton, sisal, jute, etc.).

Features of the new GS series include: a spark arresting muffler; non-siphoning suction fed fuel system; generator and battery cut-out switch for the full electrical circuit. The trucks also contain a totally enclosed generator and starting motor, shielded safety fuel fill cap and protected gas tank, covered battery terminals and a flame arresting air cleaner. Available in capacities from 3000 to 10,000 lbs.

For details, use Key **# MH-8** on Inquiry Card on page 43.



VEHICLE STEERING AID

The Kosch Mfg. Co. has developed a new steering aid for materials handling vehicles. The unit is a combination steering wheel and automatic clutching device. Chances of accident to operators of industrial trucks and tractors, lift trucks, and other vehicles with small turn wheels are lessened because of the "no kick-back" feature of this steering device. The working mechanism in the hub assembly eliminates all shock and "kick-back" that frequently catches an operator unaware and breaks a bone or severely bruises a wrist or hand.

Designated Steering-Aid, it is said to hold the steering gear stationary, no matter how much "kick-back" the guide wheels get from hitting bumps, obstacles on the floor, stacks, or building columns. It turns the wheels but the obstacles can't. The unit automatically releases when the steering wheel is turned, so normal steering results. Another practical advantage is that the steering aid functions as an "automatic pilot" on the vehicle, holding it on course even over bumps and obstacles.

The unit is self-contained and has no costly hydraulic or electrical mechanism, is permanently lubricated and sealed for life.

For details, use Key # **MH-9** on Inquiry Card on page 43.

TWO-SPEED ELECTRIC HOIST

This frame 1, 2-speed Wright Speedway Electric Hoist, equipped with fractional horsepower 1800/450 rpm motors, provides a fast lifting and lowering speed and a slow, ¼ normal speed, for gentle positioning of production work.

Manufactured by the Wright Hoist Division, American Chain & Cable Company, Inc., the unit is said to parallel the sensitivity of control of air hoists and to feature easy maintenance. The housing is designed so that the side and end covers can be quickly unscrewed for the servicing of exposed parts in a matter of minutes. Two easy adjustments of a set screw are all that is required to compensate for brake lining wear.

For details, use Key **# MH-10** on Inquiry Card on page 43.

PORTABLE CONVEYOR

A new portable conveyor, said to move tons of material in minutes, has been introduced by the Phillips Conveyor Co. The multi-purpose Model 808-H illustrated here is for use with many types of material.

Specifically designed to move bulk materials from a floor at a

vertical angle, it is also available with telescoping landing gear that permits conveying material at a 45 to 90 degrees angle. The conveyor can be moved from one location to another and quickly put into action. It is powered by a ½ h.p. or 2 h.p. electric motor and available in lengths up to 12 feet for heavier material and longer lengths for lighter material. Belt speeds can be varied to meet requirements. Attachments such as hoppers, landing gear, stands and discharge conveyors can be added to specifications.

For details, use Key # MH-11 on Inquiry Card on page 43.

CLEANING PARTS WITH INFLAMMABLE LIQUIDS CAN CAUSE DISASTROUS FIRES!

KLEER-FLO SOLVES PROBLEMS WITH SAFETY EQUIPMENT AND HIGH FLASH POINT SOLVENTS

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America's Foremost Producer of Parts Cleaning Equipment

PRACTICAL MFG. CO.

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(For details, use Key # B-16 on card on page 43)

OPERATORLESS TRACTOR

An electronic industrial tractor that requires no operator is shown at work in a food warehouse where it has been in operation for a number of months. Embedded just beneath the surface of the concrete floor is a guide wire that emits an electronic signal which is sensed by the guidance receiver on the tractor—guiding it left or right and controlling stopping and starting. This guide system may also be a wire under a tape laid on the floor or a wire strung overhead. There is no physical contact between wire and tractor.

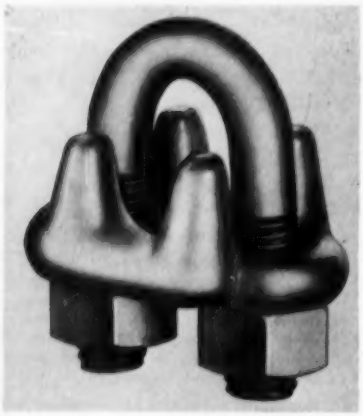
Called the Guide-O-Matic and manufactured by Barrett-Cravens Co., the operatorless tractor can pull up to 6,000 pounds in the installation shown and the electronic wire stretches some 300 feet. The tractor has a top speed of over six miles per hour and is equipped with hand controls.

For details, use Key # MH-12 on Inquiry Card on page 43.

WIRE ROPE CLIPS

Designated ACCO Wire Rope Clips, these assemblies are drop-forged from high grade steel and are said to provide positive "grips of steel" for tough, heavy-duty service. Introduced by the Wire Rope Divisions, American Chain & Cable Company, Inc., the clips are prepackaged for convenience. Their base channel is shaped to hold wire rope securely without damage to individual strands. They can be applied on the job and no vise or other special tools are required.

The U-bolts are protected against the formation of rust and corrosion by hot-dip galvanizing after threading. Further protection is added by a green chromate coating which is applied after the galvanizing. The green chromate color also aids

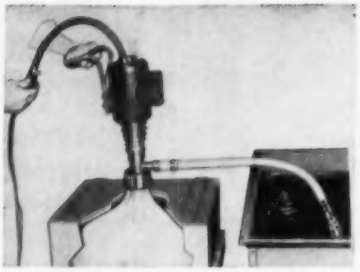


product identification. Bases of the assemblies are also hot galvanized as are the Standard American hex nuts. The clips are manufactured to secure wire ropes of ⅛ inch to 1¼ inch diameters.

For details, use Key **# MH-13** on Inquiry Card on page 43.

PORTABLE ACID PUMP

The Thompson Manufacturing Co. has introduced an acid pump that is power-driven and portable, designed to safely transfer acids from standard carboys and drums as well as from small, open, plating and storage tanks. Known as the Centri-F Acid Pump, it is driven by a totally enclosed, ¼ H.P., 115 V, 60 Cycle, 3450RPM motor. The pump delivers a smooth, spurt-free flow



of acid at the rate of approximately six gallons per minute.

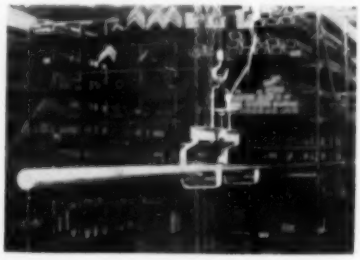
Although designed to operate at floor level, the pump is said to operate at near full capacity under a six foot head of acid. The outside diameter of the intake tube is 1⅝", fitting the opening of almost any standard carboy and drum. The length of the intake tube, below the spout, is 23", which permits it to be inserted into a 13 gallon glass carboy, just short of striking the glass bottom. When used for open tanks, the pump is lowered into the tank as the level of the acid recedes. Additional sections of overflow tubing, complete with couplings, are available. The pump is constructed of stainless steel, teflon, and polyethylene.

For details, use Key **# MH-14** on Inquiry Card on page 43.

BAR STOCK HANDLER

The bar-lugger, a new type bar stock safety handler has been made available by Industrial East Co., and is said to speed up and simplify the moving and handling of bar stock by 60 percent, in and out of pigeon-hole storage bins. One operator can safely handle up to 6 inch round, square or hex-shaped bar stock where formerly two or even three men were required, according to the company. The unit weighs approximately 40 lbs., connects easily in one motion to the plant overhead conveyor.

To store a bar of stock, the bar is securely picked up on the Bar-



Lugger, clamped on the V grooved rollers by means of a 1 inch-8 screw and directed into the pigeon hole. By pushing slightly on the end of the bar, the rollers permit the bar to roll easily onto the rack. Withdrawal is the same, in reverse. Special advantage is that the operator can automatically hold and balance the stock in mid-air with no added support.

For details, use Key **# MH-15** on Inquiry Card on page 43.

Eyes in Industry

In the United States alone more than 80,000 persons, it has been estimated, have lost the sight of one eye as a result of industrial hazards and nearly 8,000 have lost the sight of both eyes as a result of these accidents, according to H. W. Hofstetter in his book, "Industrial Vision," published by Chilton Company of Philadelphia.

The importance of industrial vision is not fully understood, Dr. Hofstetter says, and the fact that an employee's eyes are tools as specialized in their application as the hammers, gauges, and files he uses to carry on his trade has often been disputed by experts.

"The confusion," Dr. Hofstetter says, "seems to lie in the attempt to associate vision characteristics with specific jobs or typical jobs classifications, rather than with the vision requirements or the visual demand specifications of the job." He points out that industrial job classifications are based on criteria that have no connection with vision and oftentimes a great majority, if not all, of the individuals in a given sample will have vision superior to the minimum required for the job.

He gives a complete statistical analysis of vision and industrial efficiency by considering all sides of the controversial subject. Employee performance and competence is shown in the light of supervisors' ratings, production ratings, quality ratings, accident frequency records, and absenteeism.

FREE BULLETINS & CATALOGS

As a convenience to executives, these new publications of manufacturers are offered by the Reader Service Department of SAFETY MAINTENANCE. To obtain copies write in the key numbers on the free-postage card below.

NOISE CONTROL

Noise Reduction Panels 260
Elof Hansson, Inc. Panels to isolate or enclose noise are featured in this illustrated bulletin. They can be installed as ceiling-high or free-standing partitions, rolling panels, etc., and require no special tools to install.

Sound Level Meter & Analyzer ... 261
Mine Safety Appliances Co. Featured in this 4-page brochure is a unit that combines the functions of a sound level meter, octave band analyzer, and a narrow band analyzer. Information includes specifications, construction features and operation of the compact device.

Ear Plugs 262
Surgical Mechanical Research, Inc. Illustrated folder describes a line of ear plugs designed to cut down all frequencies over the entire sound range. The plugs are flexible and mold themselves around high points and depressions of the ear canal for greater sound stoppage.

Sound Analyzers 263
Panoramic Radio Products, Inc. Sonic analyzers which automatically separate the frequency components of a complex audio wave and measure their frequency and magnitude are fully explained in this 6-page brochure. The units are suited for measurement of harmonic and intermodulation distortion in public address systems, hearing aids, receivers and other audio devices.

FIRE & HEAT PROTECTION

Lightning Protection 264
Independent Protection Co. Descriptive folder explains the use of protection systems designed to safeguard all types of structures from lightning. Information includes architectural specifications, applications and recommendations.

Heat Resistant Paint 265
Chem Industrial Co. Informative bulletin features an aluminum paint said to withstand temperatures to 1700 degrees without burning or blistering. It is intended for use on all hot metal surfaces, and is corrosive resistant as well as fast-drying.

Fire Hazards Index 266
Buffalo Fire Appliance Corp. A handy guide to determine the proper type of fire extinguishing equipment to use against various fire hazards. Included is an illustrated description of a complete line of fire equipment, with a variety of extinguishers represented.

MAIL POSTAGE PAID CARD FOR MORE DATA

MATERIALS HANDLING

Hoisting Equipment 267
The Yale & Towne Mfg. Co., Yale Materials Handling Div. Fully-detailed 44-page booklet on a line of hoisting equipment. The booklet explains how to select the proper type of hoisting equipment for a particular job and presents, with illustrations, a wide variety of available hoists. Easy-to-read charts offer specific data on each, including hoisting speeds, test loads, prices, etc.

Chains & Slings Use Guide 268
S. G. Taylor Chain Co., Inc. 22 x 28 inch wall chart serves as a guide in the proper use of alloy chains and slings. The chart also provides definitions, instructions and cautions governing the purchase and use of chain, as well as data on inspection, wear and the use of chain under heat conditions.

Wire Rope Assemblies 269
Macwhyte Co. 24-page catalog on wire rope assemblies which consist of preformed wire rope with a terminal attached to one or both ends. Dimensions, drawings, sizes and capacities are given for the wide variety of available terminals and wire rope.

LIGHTING & ELECTRICAL EQUIPMENT

Emergency Lighting 270
Carpenter Mfg. Co. Illustrated catalog features a line of portable flood and searchlights, colored warning lights and automatic emergency lights. Details for the various units include size, weight, battery and bulb data, etc.

High Output Fluorescent Lamps .. 271
Sylvania Electric Products Co. The advantages and usages of a high output fluorescent lamp are described in this 4-page brochure. The lamp, said to produce more than double the light output of similar conventional fluorescent lamps, may be used for indoor or outdoor lighting.

PERSONAL PROTECTION

Work Gloves 272
Edmont Mfg. Co. Illustrated folder reviews the advantages of using plastic, neoprene and natural rubber gloves. Several case histories are presented showing the savings made possible by substituting the gloves for others previously employed for a host of jobs.

Linemen's Protective Equipment . 273
Charleston Rubber Co. A brand of linemen's protective equipment, including gloves, glove bags, sleeves, danger flags, etc., is featured in this 32-page catalog. The text includes information on the manufacture and testing of the equipment, as well as instruction in its care and use.

(Continued on the next page)

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March, 1957 **Please send me the following free data**

Free Bulletins (Cont'd)

Industrial Clothing 274
Worklon, Inc. A wide variety of acid resistant work clothing made of orlon and dynel is described in this illustrated catalog, including shirts, pants, jackets, gloves, etc. The booklet also outlines a series of laboratory reports on the technical properties of orlon acrylic fiber, illustrating its high resistance to acids and caustics.

TRANSPORTATION

Back-Up Alarm 275
E. D. Bullard Co. A mechanically operated alarm for vehicles that is sounded when the vehicle is placed in reverse motion is featured in this bulletin. An explanatory diagram of the unit, as well as installation instructions, are included.

Safety Belts 276
Sperton Corp., Div. of Sparks-Withington Co. Featured in this illustrated bulletin is a vehicle passenger safety belt that also serves to hold the door closed on impact. The belt meets all requirements established by the Civil Aeronautical Authority and the Society of Automotive Engineers.

MISCELLANEOUS

Flash Point Testers 277
Fisher Scientific Co. Detailed brochure on a series of flash point testers for petroleum products. The various models available are described along with a number of accessories. Information on the operation of the units is also provided.

Combustion-Testing & Air Measurement 278
General Scientific Equipment Co. Illustrated and described in this bulletin is a line of gas pressure manometers, oil flow graduates, air velocity meters, filter gauges, etc. Information includes prices for the various combustion-testing and air measurement devices.

Silicone Products 279
Dow Corning Corp. Nearly 150 available silicone products are described in this handy reference guide. The products are grouped by usage, enabling the user to locate a material by what it does as well as by what it is.

What's YOUR Problem?

- **Has an accident or fire interrupted production?**
- **Want to know how to prevent it?**
- **Do you need background information on equipment for industrial safety, hygiene, or maintenance?**

As a service to its readers, "Safety Maintenance" will arrange to supply manufacturers literature on the following subjects. Just insert the key number on the Readers Inquiry Card on the preceding page and be sure to fill in your name and address. If you need information on a specific type of product, simply write it in on the Inquiry Card.

Key Number	Subject
	PERSONAL PROTECTION
101	Safety Goggles
102	Face Shields
103	Lens Cleaning & Anti-Fogging Equipment
104	Sweat Band
105	Hard Hats
106	Respirators & Masks
107	Protective Clothing
108	Women's Protective Clothing
109	Safety Belts
109A	Vehicle Safety Belts
110	Safety Gloves
111	Foot Protection
112	Anti-Slip Soles
113	Oil-Proof Soles
114	Welding Helmets
115	Welding Curtains
	FIRST AID AND PERSONAL HYGIENE
120	Protective Skin Cream
121	Skin Cleansers
122	Sanitary Drinking Facilities
123	Athlete's Foot Control
124	Salt Tablets
125	Noise Analysis & Control
126	Antiseptic Medication
127	Burn Medication
128	First Aid Kits & Supplies
128A	Rescue Kits
129	Stretchers & Litters
130	Throat Medication
131	Eye Wash Fountains
132	Hearing Tester
133	Disinfectant—Deodorants
	FIRE PROTECTION
141	Safety Cans
142	Drum Safety Valves
143	Safer Solvents
144	Degreasing Machines
146	Fire Blankets
148	Watchmen's Control Systems
149	Fire Resistant Hydraulic Fluids
	LIGHTING EQUIPMENT
150	Alarms & Warning Lights
152	Electrical Insulation Tester
153	Fluorescent Lamp Guards
154	Emergency Lights
	MAINTENANCE
160	Anti-Slip Floor & Mats
161	Anti-Slip Waxes & Finishes
162	Floor Cleaning Compounds
163	Cleaning Machines
164	Oil & Grease Absorbents
165	Paints
166	Floor Resurfacing Materials
	LADDERS & HANDLING
170	Ladders
171	Ladder Safety Devices
172	Scaffolds
173	Work Platforms
174	Slings
175	Safety Hooks
176	Fork Truck Steering Aid
177	Acid Pumps
	GUARDS
178	Machine Guards
179	Power Press Feeders
180	Safety Tools
180A	Valve Operators
	EDUCATIONAL AIDS
181	Safety Signs
182	Safety Awards & Emblems
183	Employee Safety Guide
184	Aisle Marking Equipment
185	Bulletin Boards

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WAYS
There are three safe practice ways that do the most good in keeping free of accidents, all based on your personal desire to know safety and keep yourself safety-minded by studying the hazards of your work. They are:
1 Make sure all guards are in place and working and wear the personal protective equipment your job requires.
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As we see it: Safety is part of every job and like any craft it requires skill.
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Your Signature Here

NOTE:

Your Safety News is designed to promote better employer-employee relations. Every item is carefully weighed from this viewpoint.

INSIDE PAGES
(pages 2 and 3)

So Goes the World
Lions & Machinery have Hungry Jaws
1. YOU DON'T HAVE TO TWIST ITS TAIL
NEVER REACH INTO MACHINERY WHILE IT IS RUNNING!
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WANTED
from the CARELESS ACTS of others the WISE MAN corrects his own
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WORK OVERTIME
Dress for Safety
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FALLS
FALLS KILL 80 EVERY DAY

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Keeping the contents folksy, adding the grace note of humor, delivers your safety message with a nudge instead of a bludgeon. Your monthly chat gets enthusiasm instead of tolerance.

VIVID COLOR

Generous use of color gives sparkle, adds to the attention-riveting qualities of YOUR SAFETY NEWS. Each issue is as lively as any news-stand favorite.

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COLLISION WITH CO-EMPLOYEE—Employer's Exemption from Liability

A truck driver, injured in a collision with a co-employee while driving the employer's truck enroute to his own stalled truck, was not entitled to recover damages from the employer or co-employee, because the injury was covered by the compensation law which exempted the employee and co-employee from liability. The court ruled that though the trip may have been made on his own time, at his own expense and in part for his own benefit, the fact that the repairs were required by his employment and that the trip was being made in part for the benefit of the employer, placed it within the course of his employment and exempted the employer from liability for the injury occurring during the trip. The co-employee while acting in the scope of his employment became merged in the employer and was therefore not a third person within the meaning of the compensation law. Reversed.

White v. Ponozzo, Idaho Supreme Court, No. 8290. December 13, 1955.

EXTENT OF DISABILITY—Competent Evidence to Support Denial of Award

Claimant was properly denied compensation for an alleged back injury where there was sufficient competent evidence to sustain the finding that his present disability was due to an arthritic condition and not an injury arising out of his employment. The claimant contended that where an accidental injury aggravates a prior diseased condition the disability is compensable under the compensation act. The court held that this rule has no bearing where, on conflicting testimony, the issue is resolved against the claimant. Order sustained.

Griffith v. Viersen Oil and Gas Co., Oklahoma Supreme Court, No. 37, 159. October 23, 1956.

FEDERAL EMPLOYERS' LIABILITY ACT —Safe Place to Work

In an action under the Federal Employers' Liability Act, a jury verdict in the amount of $34,040 was improperly set aside and a new trial ordered on the grounds that the evidence failed to establish that the railroad had knowledge of an unsafe condition which caused the employee to fall and injure himself. The employee sustained his injury when he stepped on some object on a concrete walk between tracks, causing him to fall. On appeal,

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A fall on his waxed floors led Mr. Purdy to call in a LEGGE Maintenance Specialist. Here's what he learned:

The pounding of daily traffic brings the slipperiness of waxes—even most so-called Safety waxes—to the surface. Result: Accidents, absenteeism.

But with LEGGE Polishes, the Safety *lasts*. Slip-meter tests show as little as 4% loss of slip-resistance *4 months after application*. Result: fewer falls, increased productivity.

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Mr. Purdy made a lightning calculation. "Eureka," he shouted. "That's over $5,000 in Found Money. At 5% profit, I'd have to do $100,000 more business to clear that much!"

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City_____ Zone____ State_____

(Use Key # B-17 on Inquiry Card on page 43)

the court ruled that the gist of this case was the negligence of the railroad in failing to exercise ordinary care to provide the employee with a reasonably safe place in which to work. The railroad's duty to provide such was a nondelegable and continuing one, and the railroad is liable for a breach of such duty, regardless of whether its employees were or were not negligent in the premises. Since the railroad caused and permitted the condition to exist, it must have had knowledge of it and of the natural and probable consequences thereof. Order granting new trial reversed and cause remanded with directions to reinstate verdict for employee.

Howard v. Missouri Pacific Railroad Co., Missouri Supreme Court, No. 45,071, June 11, 1956.

N. Y. Safety Show

Eight thousand safety experts and accident prevention workers from all over the nation will be convening in New York for five days, starting March 18, in an effort to reduce the country's annual accident toll of 93,000 lives, one hundred times that many disabling injuries, and economic loss estimated at more than $10 billion.

New York's 27th annual Safety Convention and Exposition is being held in the Hotel Statler under sponsorship of the Greater New York Safety Council. Supporting the accident reduction effort are seventy cooperating agencies, among them the Army, Navy, Atomic Energy Commission, Red Cross, branches of city and state governments, and business, civic and engineering organizations.

Sixty-two separate sessions are scheduled, covering almost every phase of traffic, industrial, home, school and public safety. More than 200 addresses will be made and reports read by scientists, engineers, Federal officials, law enforcement officers, educators, industrial and insurance executives, and safety directors.

New York City is officially observing "Safety Week" over the convention period in welcome to the accident prevention workers and to emphasize individual responsibility for safety.

The Safety Council is holding, in conjunction with the convention, an exposition of latest developments in safety devices, protective equipment, demonstrations of psychophysical tests, and other aids to accident prevention. One hundred and fifty firms and associations will have displays.

Machinery Accidents

Machinery, which today causes one third of the permanent partial injuries suffered by industrial workers, will become an even more important factor in accidents and injuries as mechanization and automation are stepped up, according to a talk delivered at the annual meeting of The American Society of Mechanical Engineers.

Theodore F. Hatch, professor of industrial health engineering in the University of Pittsburgh's Graduate School of Public Health, urged the need to design machinery so as to minimize the likelihood of human errors. Among the factors contributing to such errors, he said, are poor lighting, excessive noise, vibration, monotony of operation, and failure to adapt machine dimensions to human dimensions.

An Engineering Failure

"Pushing the wrong switch button among a battery of identical buttons reflects an engineering rather than an operator failure. A truck accident resulting from failure to apply brakes soon enough may be caused by restricted leg room for the driver, as well as by inattention to the job," he said.

Mr. Hatch added that engineers must take the lead in translating information from the biosciences into useful terms for engineering application.

He blamed the lack of an adequate body of knowledge of human capacities and behavior on two factors: failure of engineers to achieve a deep understanding of the anatomical, physiological and psychological problems involved; and failure of bioscientists to recognize the need to work with industrial engineers on this problem.

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(For details, use Key # B-18 on card on page 43)

SAFETY starts on the floor

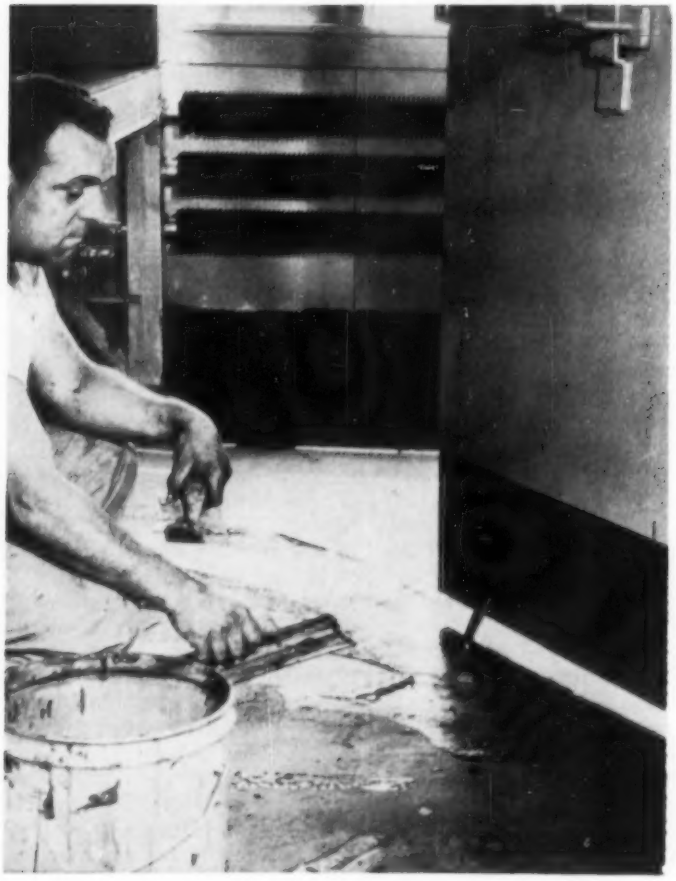
Flooring material solves problems of static electricity, oil and foot comfort.

In an ammunition plant, such as that of Remington Arms in Bridgeport, Connecticut, safety is the first consideration. It is a hazardous business, but the company's outstanding safety performance has been based on equipment designs and operating methods developed out of more than a century of experience with explosives.

Among other safety features at the Bridgeport plant, sparkproof conductive flooring is a must in all explosives manufacturing and storage areas. Its purpose is to dissipate any static electricity charges that might ignite the sensitive primer mixture. All 50,000 square feet of this special surfacing is checked monthly for conductivity. Any variation from established conductivity standards means immediate resurfacing.

Constant wear and frequent washing combined to shorten the life of conductive flooring materials previously used. (Some areas are routinely washed down a minimum of five times a day.)

For the past eight years, however, the plant has been using a neoprene composition flooring which is trowelled on as shown in the photograph. It can be applied over conventional wood, cement, or masonry floors. Heavily used areas may be easily patched to preserve conductive integrity.



Although the material is applied like conventional mortar, it consists of neoprene latex combined with a special drying powder, a wear-resistant aggregate, and conductive particles. The neoprene performs several functions: it helps bond the mortar to the floor, imparts sufficient elasticity to the surface finish to prevent cracking and chipping, and acts as a binder for the conductive particles which would otherwise be washed or leached away by continued floor cleaning.

The plant has found that the flooring material has simplified its floor maintenance. Non-conductive neoprene flooring is also used in the plant's shop area for oil resistance and in the dispensary for foot comfort and eye appeal.

Picture by courtesy of E. I. du Pont de Nemours & Co., Inc.

Mischief Afoot

A humorous approach to the deadly-serious subject of industrial safety is featured in the new 23 minute 16mm color film, "Mischief Afoot," recently completed by Victor Kayfetz Productions, Inc. for the Lehigh Safety Shoe Company of Emmaus, Pennsylvania.

Mr. Frank Griswold, manager of the safety shoe company, requested a script and story board based on his original outline. Although prepared with the cooperation of the National Safety Council, it was decided to test the acceptability of the film in a meeting of prominent safety engineers from the steel, aviation, atomic energy, and public utility industries. They were unanimous in their approval of the humorous story approach.

The film tells of two industrial workers and the sister of one of them—and some of their personal problems and adventures.

In addition to the parts played by the professional actors and actresses, the film has animated cartoon sequences and an animated sequence showing the construction of a safety shoe.

Prints of the 23 minute industrial safety film: "Mischief Afoot" will be loaned without charge by the Lehigh Safety Shoe Company, Emmaus, Pennsylvania.

Safe Pedestrian Film

A Walt Disney traffic safety film, "I'm No Fool As A Pedestrian," has been offered to police departments throughout the nation by the Traffic Division of the International Association of Chiefs of Police, in cooperation with the Automotive Safety Foundation. 250 prints have been made available to city and state law enforcement agencies on a population basis.

The 16mm Technicolor movie will be shown to school children and other groups as part of police department traffic safety programs.

Describing man's age-old problem of walking safety in "getting from here to there," the film stars Disney's entertaining character, Jiminy Cricket, who lays down the basic safety rules for a "happy pedestrian." Using catch lyrics and melody, Jiminy conducts an unusual contest between Y-O-U and a Common Ordinary Fool. During the contest, pedestrian safety rules are reviewed.

Conveyor-Truck Film

Trukveyors, in-the-floor type conveying systems for moving 4-wheel platform trucks, and how they solve material handling problems, are the subject of a new 16mm sound, color film now released by Link-Belt Company.

Entitled "Pathway to Profits," the film illustrates how the installations can solve the many problems of handling merchandise shipments and reduce operating costs on railroad terminals, motor freight docks, air and water terminals, distribution centers, parts depots, warehouses, assembly plants, and in general many manufacturing plants. The conveying by Trukveyor, of large component parts through process and assembly operations in a plant of a heavy equipment manufacturer is also shown.

Basic operation of the system is portrayed in action throughout the film. Engagement and disengagement of 4-wheel platform trucks with conveyor chain below floor, is clearly shown in animated detail, as are operations of other working components comprising the system.

The film has a running time of 12 minutes and is available for free showing upon written request to the Public Relations Department, Link-Belt Company, Prudential Plaza, Chicago 1, Illinois.

Industrial Fire Film

A new instructional film on fire prevention in industry has recently been released. Entitled "The First Five Minutes," it was produced by Audio Productions, Inc., with the cooperation of the National Board of Fire Underwriters. It is in black and white and runs 27 minutes.

The film emphasizes the importance of the industrial fire brigade in plant fire prevention and protection. It features Chief Henry G. Thomas of the Hartford Fire Department. Chief Thomas is a past president of the International Association of Fire Chiefs and an authority on fire prevention.

The purpose of the film is to bring to management's attention the fact that a very small number of big industrial fires every year are responsible for a substantial portion of the nation's total fire losses. Recently, according to the National Board of Fire Underwriters, 300 large-loss fires—those resulting in losses of $250,000 or more—accounted for 23 percent of the year's $785,000,000 losses.

Such fires, the National Board observes, have serious effect on the industry involved. Among other things, they result in:

1. Loss of workers, who may obtain employment elsewhere after fire results in plant shut-down.
2. Loss of customers, who may

obtain their supplies from others because they cannot afford to wait for a razed plant to regain production.

3. Loss of cash reserve resulting from costly repairs due to uninsured fire damage.

4. Possible loss of competitive position brought about by curtailment of activity in research and development—activity which now must be spent on subsequent rebuilding and production change-overs.

5. Loss to the community through decrease in trade as a result of reduced earnings of workers living there.

The film emphasizes that big fires, like all others, start as small ones which are easily extinguishable by well-trained fire brigades acting decisively during the first few minutes. The film reminds the audience that the industrial fire brigade has responsibilities for calling the city fire department, safeguarding lives, fighting the fire, and protecting equipment and stock.

It refers briefly to the chemistry of fire and demonstrates the proper extinguishment of fires in combustible solids, in flammable liquids, and in electrical equipment.

Chief Thomas points out that every manufacturing plant contains many fire hazards. He tells the members of the fire brigade how they can best locate the fire hazards in their plant, what precautions they should take to prevent fires from starting and spreading.

The film shows the many kinds of fire fighting weapons at a brigade's disposal and how to use them. These weapons include sprinklers, hose and other emergency fire fighting equipment.

The climax of the film is reached when Chief Thomas comments on the actions of a well-trained industrial fire brigade and the audience sees how a fire in a manufacturing plant is controlled.

Copies of this film may be obtained on loan for training personnel without charge. Request should be addressed to Bureau of Communication Research, Inc., 13 East 37th Street, New York 16, N. Y. Prints of the film may be purchased from Audio Productions, Inc., 630 Ninth Avenue, New York 36, N. Y.

Life Saving Film

This film, "No Time to Spare," was planned to help everyone give an affirmative answer to the question: "Are you prepared to save a life?" The back pressure-arm lift method of artificial respiration is shown in this film. Many different types of accidents cause asphyxiation such as electric shock, carbon monoxide poisoning, water accidents and others. Emphasis is placed on the importance of immediately applying artificial respiration as every second of delay lessens the victim's chances of recovery. This film very clearly shows the techniques through demonstrations by—the milkman who finds the housewife unconscious on the kitchen floor, by the wife who finds her husband unconscious in the garage, and the

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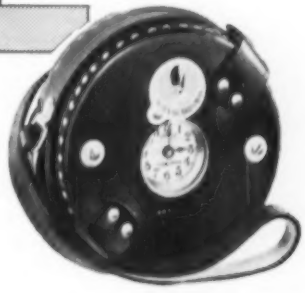

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passerby who finds the boy face down in a swimming pond. Different applications of the back pressure-arm life method (often called the Holger-Nielsen Method) are used on adults, young children and infants.

The film uses the passerby rather than the professional demonstrator and thus gets across its message that all should be able and prepared to use this method of artificial respiration. Technical advisers for the film include Warren Clayson of the Canadian Red Cross, L. B. Smith of the Physical and Health Education Branch of the Ontario Department of Education, and Dr. Ian Urquhart of the Hydro-Electric Power Commission of Ontario, and Prof. M. G. Griffith of the University of Toronto. The 16mm sound, color film can be purchased from International Film Bureau, Inc., 57 E. Jackson Blvd., Chicago 4, Ill. Sale price is $125.

Winter Driving Film

In a new winter driving safety movie, "Don't Skid Yourself," the world's only woman test driver demonstrates how to get out of a skid on snow or ice. The 13-minute film, which won an award from the National Committee on Films for Safety, has been praised by instructors as an "excellent educational aid" for illustrating safe winter driving practices especially to students enrolled in driver education courses.

Produced by the Aetna Casualty and Surety Company, the movie documents the annual skid tests conducted by the National Safety Council and also points up the the safe driving techniques that should be observed on snow and ice-covered highways. Miss Betty Skelton, nationally-known woman test driver, slides through one sequence to show the correct method of handling a skidding car —steering in the direction of the skid and pumping the brakes until the car is brought under control.

The film also points up the little-known fact of temperature inversion, showing that highways coated with snow and ice are more treacherous when the temperature is around 32 degrees than when near the zero mark.

Other research tests made by the Winter Driving Hazards Committee aid in determining how fast a car can be turned on ice without skidding and how far it takes to stop a vehicle on ice and on snow with different types of winterized tires and tire chains.

The film may be obtained for group showings on a free-loan basis from the public education department of the Aetna Casualty and Surety Company at Hartford, Conn., or through any local Aetna representative.

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Safety in Bottling

Carbonated beverage bottlers, faced with their own particular set of safety problems, were briefed recently by T. M. Mason, Assistant Secretary and Safety Engineer, Coca-Cola Bottling Company, Asheville, North Carolina, on how to set up effective safety programs in their individual plants. Mr. Mason speaking on "Safety Is Your Business," told bottlers assembled at the recent 1956 Convention of the American Bottlers of Carbonated Beverages, that only by a continuing long range safety program can plants hope to reduce accident frequency and cut accident costs.

Mr. Mason, whose company has received many safety awards, suggested that the logical steps in an accident prevention program would be to give it leadership and the support of top management; assign the responsibilty to the proper supervisory personnel; analyze and maintain accident records; check equipment for the proper safeguards; get the active cooperation of all personnel; and make arrangements for continuous training and follow through.

"The foundation on which we are going to build our safety program," he said, "is 'good housekeeping.' " This can best be accomplished by what we term our Good Housekeeping Committee. It shall be the duty of this committee to make weekly inspections, observe the degree of cleanliness in the plant generally; in rest rooms, around machines, loading docks, to observe any safety hazards that might be present, to check on tools and equipment that are not in use, see if they are stored in their proper places in a neat and orderly manner; look for grease or water on the floors or any paper, trash, etc., that might cause someone to suffer a disabling fall; and to check for undue amounts of broken glass which should be swept up. "It is also the function of this committee," he continued, "to check on jacklifts, floats or fork lift trucks that might be left in the main aisles of the plant, or any other condition that they feel might contribute to a personal injury or damage to the equipment, and to formulate and publicize among the group safety rules and regulations."

He stated that the inspections should be made at regular intervals and that the personnel of the committee, aside from the Safety Director, should be selected from the workers and should be appointed to serve for varying lengths of time. "By this means," he said, "you have a wonderful opportunity for developing a preventive attitude among all your workmen, and developing the appropriate educational activities that will reduce unsafe practices."

Mr. Mason expressed his belief in safety incentive plans. "No plant owner or manager should feel," he said, "that his plant is so small that he can't afford some incentives for safe working conditions." The speaker outlined a suggested plan that allows for sharing of a safety bonus as well as for penalties when safety rules are ignored.

PICTURE OF A MAN INSURING HIS LIFE

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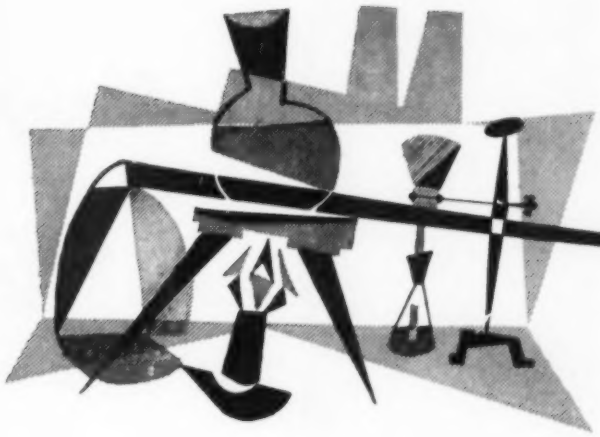
That's why, once every year, he goes to his doctor for a thorough medical checkup. This way, cancer... the "silent enemy"... can be detected in its earliest stages, when chances for cure are most favorable.

Last year, 245,000 people lost their lives to cancer... many of them needlessly, because they went to their doctors too late.

That's why we urge all men to make an annual checkup, including a chest x-ray, a habit for life... your life.

AMERICAN CANCER SOCIETY



industrial hygiene

Edited in cooperation with
OCCUPATIONAL HEALTH INSTITUTE

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Accredited Health Facilities

In the evaluation and accreditation of industrial health facilities—the program which the Occupational Health Institute administers for the Industrial Medical Association—a yardstick is provided for industry to aid in the planning of effective employee health services. Developed by the Industrial Medical Association, the following minimal standards are utilized by the Institute in the accreditation program:

A stated company medical policy;

Preplacement medical examinations;

Periodic physical examinations of employees exposed to industrial hazards;

Facilities for voluntary periodic examinations for all employees who request them;

A competent consulting staff, readily accessible to the employee;

Attention to plant sanitation, safety precautions, industrial hygiene;

Reporting of Chief Officer to member of management familiar with company medical policy;

A fully-equipped dispensary;

Properly licensed and trained medical and nursing personnel.

During the calendar year 1956, a total of 64 plant health facilities were accredited by the Institute, as compared to 39 in 1955. Surveys in the hands of Regional Consultants of the Institute numbered 37; surveys in the hands of the Committee on Standards of the Industrial Medical Association numbered seven. In all—including deferrals and evaluations delayed pending the receipt of further information—167 cases were handled by the Institute during 1956.

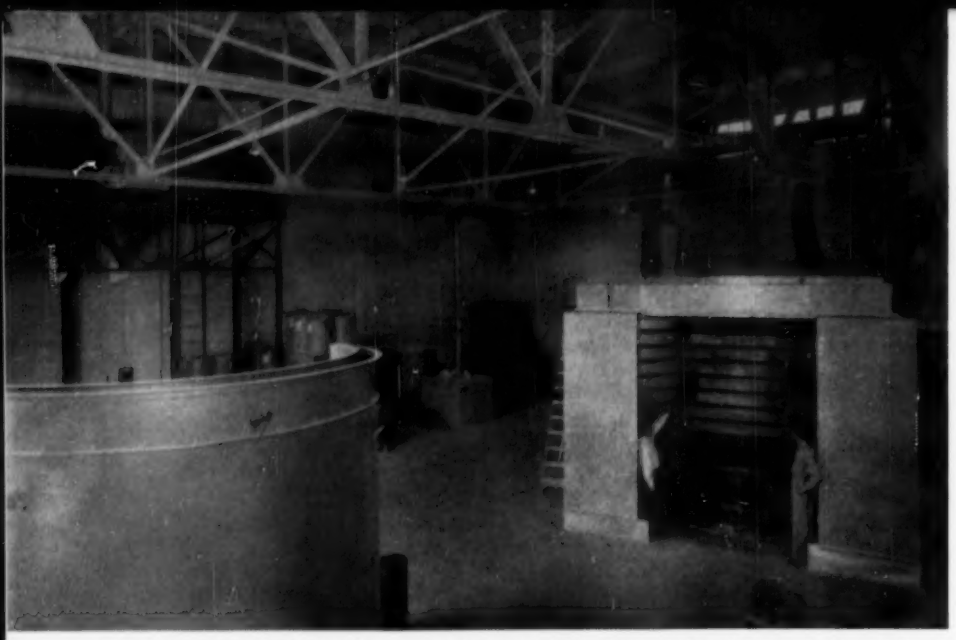
Off-the-job Illness & Injury Absences

The Council on Industrial Health of the American Medical Association has available the publication "Absence from Work Due to Non-Occupational Illness and Injury"—the proceedings of the session on work absence of the 16th Annual Congress on Industrial Health. The publication is the work of the Committee on Medical Care for Industrial Workers, a joint committee of the Council on Industrial Health and the Council on Medical Service of the AMA. Single copies are available without charge. Write to the Council on Industrial Health, American Medical Association, 535 North Dearborn Street, Chicago, Illinois.

Safety Data on Mixed Acids

The publication of a new safety data sheet on mixed acids (SD-65) is announced by the Manufacturing Chemists' Association, Inc. The booklet, part of a continuing series of safety data sheets, gives properties and essential information for the safe handling and storage of mixed acids, including material on properties, shipping containers, storage, waste disposal, medical management and employee safety.

Copies of Chemical Safety Data Sheet SD-65, Mixed Acids, may be obtained from the Manufacturing Chemists' Association, Inc., 1625 Eye Street, Northwest, Washington 6, D. C., at 30 cents each.



New in

by **ROBERT J. ZOLLER**
Pangborn Corporation

Fig. 1 Aluminum dust-exhaust "room," shown at right, disassembles, folds and stores after the chipping and breaking operation is complete and while the water-cooled shell plates (visible at left) enclose the next batch for 2-week period to complete the heating and cooling cycle.

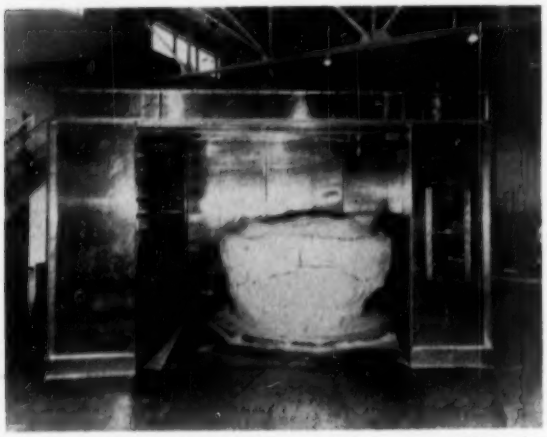


Fig. 2 Close-up of the aluminum exhaust room with a finished charge of synthetic mica ready to be broken away to get at crystalline end-product in the core of the batch.

Fig. 3 The Crystalline "nuggets" are reduced in the jaw crusher, which has both mechanism and drive totally enclosed for connection to the cloth-screen dust collector.

An ingenious dust exhaust hood—actually a demountable aluminum **room** about 12 feet high and somewhat larger in width and depth—is an unusual feature of a dust control system at Synthetic Mica Corporation in Caldwell Township, N. J. This installation is full of ideas for those whose dust control requirement is **intermittent** rather than continuous and **outsize** as regards the cubical volume of the space in which the dust is created.

At Synthetic Mica Corporation, a subsidiary of Mycalex Corporation of America, 20 tons of powdered mineral ingredients are fused from the inside out by electrical resistance heating and very slowly cooled, to outdo nature in "growing" pure clear crystals of synthetic mica, used in the manufacture of electrical insulators. The basic production process is the focus of much current interest by both the electronic and the mineral industries. But what makes the dust control system important now is the fact that the finished crystalline "nugget" of synthetic mica inside the unconverted batch (after the cycle is finished) is only a fraction of the weight of the 20 ton charge. Thus, the

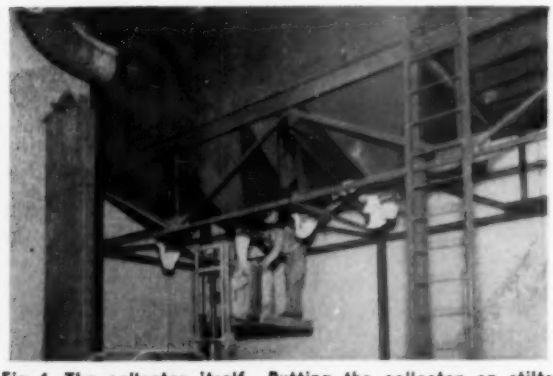


Fig. 4. The collector itself. Putting the collector on stilts gave floor storage space. The discharge hoppers are emptied by hoisting both the man and containers on a lift-truck.

Ideas

Dust Control

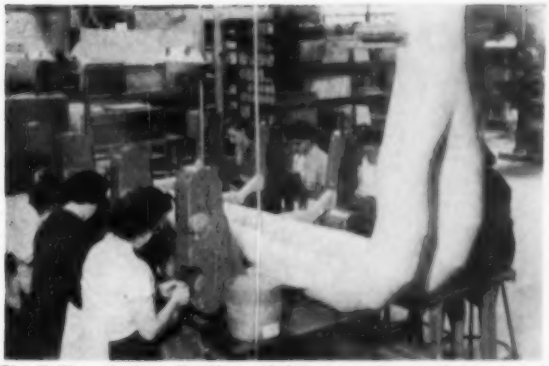


Fig. 7 The dust collection piping was lowered to bench level at a small-parts finishing line to reduce maintenance, eliminate many vertical pipes, improve airiness of plant.

bulk of the material must be removed by chipping and breaking with air tools, and this creates a very high dust content in the surrounding space.

In Fig. 1 the internal louvering of the demountable aluminum room may be seen, as can the flexible piping leading to the normal rigid piping and the collector itself at the left. Fig. 2 is a close-up of the exhaust room showing a processed charge before the dust-producing chipping and breaking is begun, and after the heating and cooling cycle within a water-cooled cylindrical shell (which has been disassembled into two parts, removed and stored at the left in Fig. 1).

The usable chunks of synthetic mica taken from the core of the batch are later reduced in a jaw crusher. This would create a further dust problem were not the entire unit enclosed in the exhaust enclosures visible in Fig. 3. The vertical exhaust pipe from the crusher ties into the same control systems as the furnace itself. So also does the more standard hood at the weighing station in the batching area, Fig. 5.

The collector itself has a capacity of 10,000 cfm of air. The dust is separated from the conveying air by cloth filter bags supported on metal frames. The unit

(Continued on page 62)

Fig. 8 The complete enclosure of the batching hopper, ingredient mixer and vertical conveyor, where molding powders for glass-bonded mica parts are blended. The door is closed during the mixing and conveying cycles of the unit.

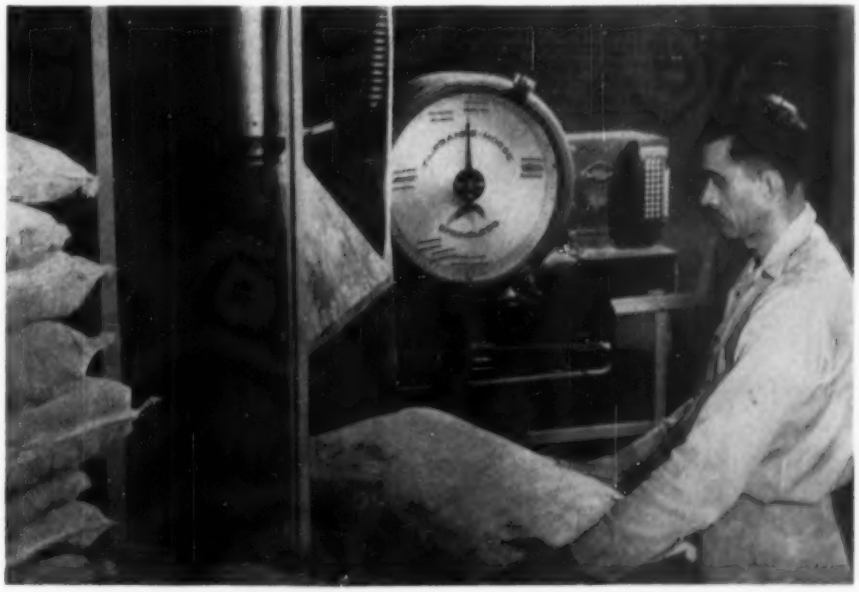


Fig. 5 The thoroughness of the dust control and collection system even extends to an exhaust hood for the procedure of weighing bagged materials in batching area of the plant.

The Value of Barrier

DERMATITIS CONTROL SERIES
other articles Feb. and Apr.

NOTE: Numbers in parenthesis indicate reference sources listed at end of article.

The Problem: Dermatoses account for 65 to 85 percent of all occupational diseases. A survey of more than 100,000 workers by the U. S. Public Health Service shows incidence of dermatosis not including other job-acquired ailments.

From an economic standpoint, the annual loss from occupational dermatoses in the United States has been estimated at about $100 million with an additional $100 million spent on medical care. (1–3)

A number of preventive measures have been recommended to avert the occurrence of such a frequent occupational disease. These include: (4–7)

1. Preselection of workers and materials.
2. Adequate medical supervision.
3. Plant hygiene.
4. Personal hygiene.
5. Adequate washing facilities.
6. Protective clothing and equipment.
7. Protective ointments.

Although workers sometimes resist the use of preventive measures provided for them, it is nevertheless the responsibility of the employer to furnish necessary facilities; indeed, failure to do so, in some instances, has been judged negligence. (8)

In theory, the protective ointments should be an effective way to prevent irritation of the worker's skin. Often, however, they are low on the list of preventive measures, though in some instances they may be the only possible means of protection and in other cases may help to protect the skin from irritants which may escape into the air in spite of other preventive measures. Too, in some industrial procedures, the face cannot be covered by protective masks and work must be carried on with bare hands because gloves are impracticable. Moreover, although workers often dislike to wear gloves, they do seem to accept protective ointments and there seems to be a distinct psychological value in their use, since the worker feels that he is being given necessary and desirable protection.

Of great importance, however, is the fact that when a protective ointment is used the worker invariably removes it with soap and water immediately after work and so removes at the same time whatever irritants are on the skin! Indeed, this has been cited as the major benefit derived from the use of barrier creams. For example, the A. M. A. Council on Industrial Health's "Report on Dermatoses Due to Oils Used in Industry," states (9–10):

"Protective ointments do not categorically protect against all of the oils, but they may aid in preventing dermatoses by causing the workmen to wash thoroughly in order to remove them from their skin."

And, too, instructions regarding the use of protective ointments generally place strong emphasis on repeated washings of the skin and re-applications of the protective. The value of such washings alone has been experimentally demonstrated by Smith and Orris at the Institute of Industrial Medicine of New York University. After groups of mice were painted with a carcinogenic material, some groups were washed and others were not. The incidence of cancer was materially reduced in those groups washed with soap and water after being painted with the carcinogen. (11)

In general, protective ointments should be:

1. **Non-irritating.**
2. **Formulated so as not to interfere with normal skin function.**
3. **Actually protective against the specific irritant for which they are used.**
4. **Difficult to rub off; and stable under working conditions.**
5. **Easy to apply and pleasant to use.**
6. **Easy to remove by means of ordinary soap and water.**

Creams

by
LEO ORRIS, M.D.
Institute of
Industrial Medicine,
New York University—
Bellevue Medical Center
New York City, New York

It must be remembered that protective creams are designed as protective, **not** therapeutic agents, and should not be used on acutely inflamed or infected skin.

Although there are a great many types of barrier creams, they may all be grouped into two general classifications:
1. water-repellents and 2. oil-repellents. These main groups may be subdivided according to content and alleged action:

1. **Vanishing cream with soap base.**
2. **Ointments providing either water-soluble or water-insoluble films.**
3. **Ointments containing light-screening chemicals.**
4. **Fatty ointments.**
5. **Powder ointments.**
6. **Ointments containing detoxifying chemicals.**

In addition to these, in recent years a number of silicone-containing ointments have been developed and widespread claims made of their effectiveness.

The answer to the question, "What protective cream is best?", is a difficult one; because there is, as yet, no **one** universal repellent. On of the leading companies in this field offers nine or ten different barrier creams, each with its own special indications, and it is necessary to match the cream with the specific hazard against which it must protect.

Another question frequently encountered is: "How can one be certain that the recommended cream is effective?"

A study by the United States Public Health Service, ten years ago, showed that only 42 percent of ointments tested, that were claimed to be protective against water solutions, actually provided such protection. Indeed, some ointments, supposedly protective against aqueous solutions were actually found superior only against oil solutions. (12) The main difficulty in trying to choose the proper cream is that relatively few **well-controlled** laboratory and clinical studies have attempted to compare the various barrier creams available, and in the studies that have been made diffierent types of evaluative procedures have produced somewhat different reults.

For example, in a study reported from the University of Michigan, 20 substances (including several silicone and non-silicone protective ointments) were evaluated for their barrier action against: 1. soap and water, 2. soluble cutting oils, and 3. heavy cutting oils and a solvent. (13) In this study, the back of the hand was used as the test object and a letter was drawn thereon with a pen. This was covered with approximately 0.5 grams of the ointment to be tested, thoroughly rubbed and then repeatedly washed for thirty seconds with the challenging solution to see whether the inked letter could be removed. It was concluded that the two ointments which contained large amounts of silicone gave the best results, and that the vehicle in which the silicone was incorporated influenced the efficiency of the tested ointments to a marked degree. The most effective protection appeared to have been provided by a mixture of 30 percent silicone in petrolatum, which afforded twice the protection furnished by petrolatum alone. A two percent concentration of silicone, however, was no more effective than vanishing cream alone. Under the stated experimental conditions, the non-silicone commercial ointments tested were found to have little value against either soap and water or soluble cutting oils, and none of the protective ointments provided an adherent barrier against petroleum solvents or insoluble cutting oils.

On the other hand, a study at the University of Cincinnati, testing silicone creams alone, and using

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different test procedures, reported that of the four silicone creams tested, the one containing 52 5/10 percent silicone afforded the most protection. (14) They state that this preparation was found effective against the cutting oils, although the 30 percent silicone in petrolatum mixture was ineffective. In this study, films prepared on standard micro slides were immersed in various tests solutions. The quantity of cream removed was measured at various time intervals up to 24 hours. The two preparations containing large percentages of silicone were found effective against a wide range of aqueous irritants or sensitizers, including mineral acids, alkalis, salts, formaldehyde, soluble machine coolants and some alcohols. None of the creams tested proved effective against petroleum fractions in the low boiling range such as gasoline, mineral spirits, Stoddard solvent and kerosene.

Only one of these preparations was subjected to extensive clinical study in industrial work and the clinical results appeared to substantiate the laboratory conclusions.

It should be noted that in neither of these studies were the factors of film thickness, temperature or humidity well controlled, and that both test objects and test procedures differed.

The only recent, adequately controlled study was reported several months ago by the United States Public Health Service. (15) This was a laboratory study in which six silicone creams, two silicone greases, ten non-silicone preparations and white petrolatum were tested against a variety of agents. In general a protective ointment was tested only by agents against which it was allegedly effective.

These tests were carried out under rigidly controlled conditions in which film thickness, temperature, and humidity were all kept uniform. Essentially, the test method consisted of securing and recording the penetration-time of a challenging solution through a thin uniform film of ointment between two confined spot-test filter papers. It was concluded that the best over-all protection was provided by white petrolatum and that the silicone greases were the best water repellents.

Silicone Advantages & Limitations

These findings confirm the earlier study reported by the Public Health Service in 1946, (12) before silicone creams were available, in which 27 commercial ointments, anhydrous wool fat, white petrolatum, and Carbowax 1500 were tested against a variety of agents. At that time, it was concluded that anhydrous wool fat and white petroleum were among the best general skin protectives, not only against alkalis and acids, but against oils as well. Where conditions are such that this protection must be supplemented, numerous commercial ointments, they stated, are available. These they found to vary widely in ability to withstand penetration by alkali, acid or oil.

In the current United States Public Health Service Survey, organic-solvent challenging liquids were not stressed, since admittedly, the silicone polymers are ineffective against these agents. The study emphasized that such evaluative procedures may be valuable as a guide to the clinical usefulness of barrier creams, since it is improbable that barrier agents which prove

ineffective in laboratory tests will provide good protection in clinical trials.

As yet, similarly well-controlled, comparative clinical studies have not been conducted or reported, leaving a large gap in the available information.

Although the silicone creams have been found to have a fairly wide range of effectiveness, they have several drawbacks. The first is the cost factor, since silicone creams cost much more than non-silicone preparations; and the second is cosmetic acceptance, or lack of it, since those agents tested and found effective use bases either too greasy or too tacky. However, new preparations are now being evolved, which promise to be both effective and pleasant to use. One of these, an experimental non-silicone cream studied recently at the Institute of Industrial Medicine, was found very effective in preventing skin cancer in mice following the application of carcinogenic material.[11]

It must be re-emphasized, however, that before any preparation is marketed and widespread claims made for its effectiveness, it should, routinely, be subjected to critical, well-controlled, laboratory and clinical studies to determine its areas of effectiveness.

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Picture by courtesy of John H. Breck, Inc. From an address presented at the 26th Greater New York Safety Convention.

Gas Accidents

Any effective program for the prevention of gas incidents requires complete planning, efficient organization and continuous training, according to T. A. Watson, Assistant Division Superintendent, Power Production, United States Steel Corporation, South Works, Chicago, Ill., in an address presented at the 1956 Iron and Steel Convention.

He said that planning should consist primarily of the preparation of efficient procedures for the safe operation of gas consuming equipment, including the operation of suitable apparatus for detecting and measuring toxic gas concentrations in areas where personnel must work. Since, however, there is an

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ever-present potential gas incident near gas producing or consuming equipment, procedures must be developed to cope with the incident should it occur.

To utilize efficiently the brief time in which a rescue must be effected, rescue plans should be carefully made and include such items as trained rescue squads, designation of storage locations where rescue equipment will be kept serviced and available for immediate use, signal systems to call rescue squads to designated assembly areas, and plans for coordination of all agencies involved in rescue work.

Responsibility & Training

Efficient organization must include the allotment of definite responsibilities to agencies within the plant, such as training bureau, safety bureau, medical staff, equipment service shops and the operating departments, for a coordinated effort to prevent gas incidents, or to minimize the effect should one occur, said Mr. Watson.

Training for the prevention of gas incidents includes familiarization with the safe practice procedures and the use of check lists for the safe handling and consuming of gases. Training of the rescue teams must be continuous to maintain desired efficiency in such items as rescue procedures, artificial respiration, first aid and the use of equipment employed by the rescue squad.

Dust Control

(from page 57)

is mechanically rapped for five minutes every four hours to cause the dust to fall into the collection hoppers from which it is removed. The collector is set high off the floor (13 ft from floor to bottom of hoppers) to permit the storage of raw materials at working levels, Fig. 4.

Molding Processes

Dust is also well-controlled in the plant of the parent company, Mycalex Corporation of America at Clifton, N. J., where all manner of electrical components are molded from glass-bonded mica and ceramoplastics. Fig. 6 shows the complete enclosure of the mixing hoppers and elevating conveyor at one batching point. A glimpse of a canopy exhaust over a rotary continuous pelletizing machine is visible at the extreme left.

At one parts finishing line, where coated abrasive belt sanders are used at benches by eight operators (Fig. 7), the exhaust piping is lowered to bench level to simplify attachment to the various machine housings and to avoid a multiplicity of riser pipes which would interfere with the lighting of the room and the visibility of plant areas surrounding this zone.

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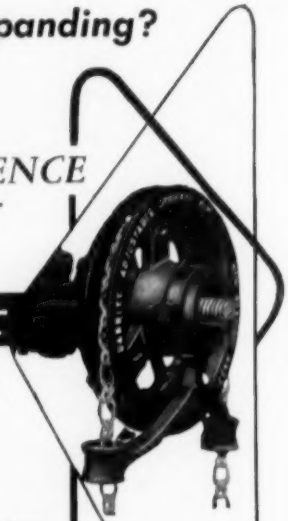

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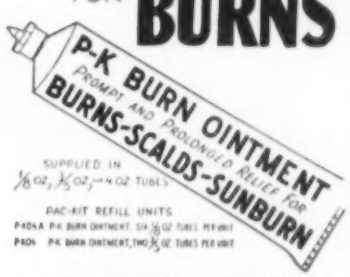

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50% Accident Reduction

A three-part safety program at Dodge Auto Main Plant in Detroit has cut lost-time accidents in half in a few months' time. One phase of the program was a well publicized drive for employees to purchase and wear safety shoes.

The second part of the program was aimed at reducing eye injuries. Special safety goggles for various plant operations, such as machining, grinding and foundry, are provided Dodge employees without cost. As in all industrial plants, however, employees were sometimes becoming lax and neglecting to wear this essential protection.

To impress employees with the importance of always wearing eye protection on the job, a unique program called "Let's Pretend" has been adopted at Dodge. It was originated by a former industrial relations director for a Toledo manufacturing firm who was blinded several years ago in an industrial accident. During the several agonizing weeks before he regained his sight, he resolved to create an industrial safey program stressing the value of eyesight.

Blindness Simulated

Participants in the program attempt to perform normal functions under simulated conditions of blindness. Employees first listen to a recorded commentary on blindness and its effect on the individual. They are then blindfolded and asked to perform such simple everyday tasks as lighting a cigaret, pouring a glass of water, combing hair or putting tooth powder on a tooth brush. This psychological approach to the problem of industrial eye accidents has stimulated Dodge employee cooperation in wearing eye protection.

A licensing program to help prevent employee injury and property damage in the mechanized material handling operation was also put into effect recently. It affects all operators of small loading and hauling trucks used within the plant.

Operators of such equipment are required to pass driving tests and physical examinations before a license is issued. The driving test includes an obstacle course and written quiz on plant driving rules. Learner's permits are issued to those participating in the driver training program.

More Than 500 Licensed

Any infraction of a driving rule, such as proceeding in the wrong direction in a one-way aisle or hauling a "dangerous" load which might fall and cause injury to other employees, may result in suspension of the driver's license. To date, more than 500 drivers have been tested and licensed by specially trained instructors.

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Injury Rates Decline

The third quarter 1956 injury-frequency rate for manufacturing was the lowest third-quarter rate ever recorded—12.3 injuries per million employee-hours worked—according to preliminary reports compiled by the Labor Department's Bureau of Labor Statistics. This rate was 6 percent below the 1955 third quarter figure of 13.1 and was fractionally below the previous all-time low of 12.4 established for this quarter in 1954.

The monthly rate rose in July to 12.8, leveled off at 12.7 in August, and in September dropped to 11.6. In most previous years, July and August have been the highest months. The rates for both August and September 1956 were record lows for the months. The average for the first 9 months was 12.1, the same as for this period in 1954 and 1955.

Most individual industries held their injury rates for the first 9 months of 1956 at or below those for the same period of 1955. The 9-months rates of 72 industries varied by less than 1 full frequency-rate point between the two years; 38 recorded significant decreases and only 27 showed increases of 1 full point or more. The 9-months average for boatbuilding and repairing was 35.3 in 1956, compared with 29.5 in 1955. Most of the increase, however, took place in the first quarter of 1956, when the rate rose to 45.4. Steady improvement since that time brought the rate for the third quarter of 1956 to 26.1. In contrast, the rate for steel foundries has increased gradually, from 15.5 in the fourth quarter of 1954 to 25.8 in the third quarter of 1956. The 9-months average for 1956 was 24.2, compared with 18.7 for 1955. The rates for plywood mills and for compressed and liquefied gases were substantially lower in 1956 than in 1955.

Synthetic Resin Paints

Paints based on synthetic rubber resin, are being used to maintain concrete chimney surfaces of southern sugar producing plants, thereby preventing work stoppages due to inoperative chimneys.

Recently, fifty gallons of white paint based on this resin were used to cover and recondition the 190-foot chimney of a sugar-producing plant in Napoleonville, La. Owned by Glenwood Co-Operative, Inc., the plant produces raw sugar from sugar cane, and its chimney is used to carry away smoke and bagasse waste gases. Bagasse is the waste material produced from sugar cane.

This type of paint was selected because of its excellent weatherproofing characteristics, self-cleaning properties and breathing-type water repellency.

Previous coatings on the Glenwood chimney had not proved satisfactory. Exposure to varying weather conditions and temperature extremes resulted in several fractures and an extremely porous condition on the chimney's surface. As a result, moisture infiltration rusted out the underlying reinforcing steel and necessitated reconditioning of the chimney.

Employing the use of an external bracket type scaffold and starting from the base of the chimney, workmen "hammer-tested" the entire surface for loose fragments in the outer shell as they scaled the structure.

Loosened shell was cut away and the underlying concrete was deeply scored and coated with a bonding fluid. A prepared mortar mix, waterproof and acid resistant, was then trowelled in to conform to the contour of the chimney. Areas where spalling had occurred were similarly treated.

In pitted areas one inch in depth or over six inches in diameter, new mortar had to be supported by means of expansion shields and lugs which were anchored in to provide new reinforcing steel.

As the workers moved up the chimney, the entire surface was wire brushed to remove all loosened dirt, grease and deteriorating surface cement. This prepared the surface for proper adherence of the rubber resin based paint.

Upon reaching the top of the chimney, workmen dropped down in a swinging scaffold with a bos'n chair and applied the paint. Black enamel paint was used at the very top of the chimney to offset the possibilities of discoloration from the steady stream of smoke issuing from the top of the chimney.

A special Certificate of Commendation was presented to the Army Chemical Corps by the Manufacturing Chemists' Association, Inc. In presenting the award, General John E. Hull, USA (Ret.), president of the MCA, noted that both the military and civilian personnel accident frequency rate of the Chemical Corps compared favorably with private industry for the year 1955.

"The military accident frequency rate of 2.98 per 100,000 man-days of exposure was especially significant," General Hull said, "because military personnel are of necessity placed in hazardous situations which would not occur in industry."

The Chemical Corps civilian employee accident frequency rate of 4.04 per million man-hours worked compares favorably with the 12.10 per million man-hours average of "all manufacturing" as reported by the Bureau of Labor Statistics.

• • •

The Chemstrand Corporation Decatur operations passed another milestone as the chemical textile fiber firm's Research and Development Division marked two million man-hours without a lost-time accident.

Chemstrand's Acrilan manufacturing plant and corporate administrative group at Decatur hit the two million safe man-hour mark earlier so the Research Division record made it two million safe man-hours across the board for both major Decatur operations of Chemstrand.

Dr. Frank J. Soday, vice president and director of Research and Development said, "We take real pride in this safety record and I want to express my sincere appreciation to all the Research and Development people who made this record possible by making safety a byword in their daily work."

• • •

The American Safety Razor Corp. has won the National Safety Council's Award of Merit for completing more than 2,000,000 man hours of operation without a lost-time accident during 1956 at its main plant in Staunton, Virginia. The American-Associated Insurance Companies also have awarded the plant its Merit Award Plaque for this outstanding safety record.

In 1954 a study of its previous accident records showed that "good housekeeping" probably would be the most important factor in promoting industrial safety among its 1200 employees. Safety executives then distributed and posted 24 general plant safety rules and put them into effect on a voluntary basis. Next, ASR opened an accident prevention program with a "Good Housekeeping Contest" in which six sections of the company competed in weekly inspections for $1,000 worth of prizes. A safety committee also made inspections without advance notice, scoring on cleanliness of aisles, machines, equipment and work areas and correct piling and storage of materials and equipment.

• • •

Rural letter carriers delivering mail in their own vehicles in eight states and the District of Columbia have won honors from the National Safety Council for their safe driv-

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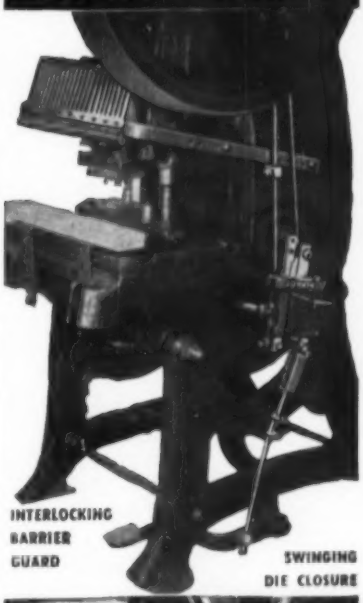

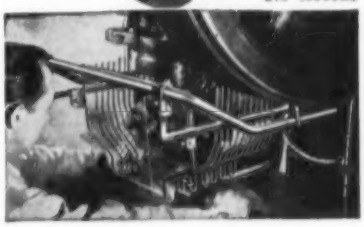

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ing, Acting Postmaster General Maurice H. Stans has reported.

A total of 32,330 rural carriers in 15 Post Office Department Regions over the nation were entered in the 1955–1956 National Fleet Safety Contest of the Council. The contest covered the period from July 1, 1955 to June 30, 1956.

Final results now show top honors for rural carriers in the Post Office Department's Regions of Wichita, Kansas; Washington, D. C. and Dallas, Texas, Mr. Stans announced.

In all three of the award-winning groups the accident rate for rural carriers was reported at less than one accident for every 100,000 miles driven in delivering the mails.

This was the first year in which postal fleets were entered. In addition to one rural fleet from each region, a fleet was entered from each region in "city fleet" competitions—30 postal fleets in all.

While none of the Department city fleets won an award, Mr. Stans said "a very commendably low accident rate for congested city driving of 4.78 accidents per 100,000 miles driven was registered."

In some regions the city driving figure was well below this 4.78 average—for example 2.33 in the Dallas Region, 2.42 in the Wichita Region and 2.94 per 100,000 miles in the Atlanta Region.

• • •

Monsanto Chemical Company's safety record during 1956 was the best in its history, George L. Gorbell, safety and fire protection manager, has announced. The accident frequency rate of .95 major injuries per million man-hours worked was a 27 percent improvement over the 1955 rate of 1.31.

There were no fatal accidents on the job among Monsanto's more than 19,000 employes during 1956 and the company's accident severity rate for the year showed an 87 percent decrease from 1955.

Three Monsanto facilities, each of which operated without a major accident during 1956, were named as President's Trophy winners in their respective groups in the annual safety contest sponsored by the company. The winners were: Group I, Everett Plant, Everett, Mass., with 3,470,369 safe man-hours worked; Group II, Shawinigan Resins Plant, Springfield, Mass., 1,482,935 man-hours; and Group III, the research laboratory at El Dorado, Ark., 260,909 man-hours.

Monsanto's El Dorado chemical plant currently holds the record for the greatest number of man-hours—6,454,632—operated without a major injury.

• • •

Armco Steel Corporation's "Iron Man," the oldest safety trophy in the United States, will remain at the company's Middletown Works for the third consecutive year, Armco President R. L. Gray has announced.

Safety Group I at the Middletown, Ohio, steel works winner of

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wear light-weight
MARTINDALE
DUST MASK!

For NON-TOXIC DUSTS
EXCEPT FREE SILICA

It's foolish to breathe dust and dirt when it can be avoided in thousands of instances by using a face-fitting Martindale Aluminum Mask and replaceable cotton filter pads.

In factory, store, feed mill, etc., these masks offer excellent protection against over 400 dusts such as wood, coal, grains, rust, paper, insect powders, etc.

Made of soft rolled aluminum, masks weigh less than ½ oz. They permit free speech, clear vision, easy breathing. Only clean gauze touches the skin. WORKERS LIKE THEM.

MARTINDALE PROTECTIVE MASKS $.30 each
No. 1 Refills (Standard wt.) .02 each
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Write for quantity discounts.
MARTINDALE ELECTRIC CO.
1397 Hird Ave., Cleveland 7, Ohio
(For details, use Key # B-29 on card on page 43)

fully PROTECTED?
all hands SAFE?

For employee protection and plant safety, GRANET industrial GLOVES give *maximum wear per dollar*. Neoprene, rubber or plastic coated, GRANET gloves are resistant to acids, alkalies, caustics, oils, wet or dry chemicals, abrasive materials, cutting or snagging.

GRANET gloves are made by a super-sensitive automatically controlled process which builds in quality and provides longer wear life. With this *exclusive* process, *high grade* industrial gloves are produced at *competitive prices*.

Shaped fingers and palms for worker comfort, GRANET industrial GLOVES are available full or palm coated and in knitwrist, band top or gauntlet styles. *Stocked* from coast to coast by industrial and safety *distributors* — write for prices and information and name of nearest distributor.

Wear-test a pair of GRANET gloves — write for samples on your company letterhead specifying material to be handled.

GRANET
THE GRANET CORP.
29 LORING DRIVE, FRAMINGHAM, MASS.
(For details, use Key # B-30 on card on page 43)

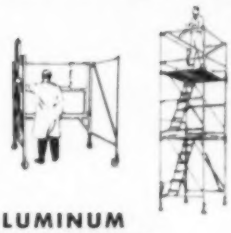
Ladders and Scaffolds by Patent Scaffolding Co.

"Gold Medal"® LADDERS

Safety Platform Ladder illustrated. Platform heights 3′ to 18′. *UL Approved.* Also wood and magnesium ladders, single types 8′ to 24′, extension ladders 16′ to 32′ and all types of step ladders to 20′.

"Gold Medal"® Junior SWINGING SCAFFOLDS

Extra-safe for light maintenance and painting outside of buildings, tanks. Steel wire rope replaces rope tackle for greater safety; winds on drums attached to scaffold. Three-way lock prevents slipping. *UL Approved.*

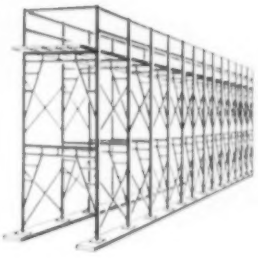


ALUMINUM "Fold-A-Way" SCAFFOLDING

"Packaged" units open like a book for fast set-up. Require minimum storage when folded. Rollers allow easy movement when erected. Base area 4½′ x 6′. One, two or three sections high. *UL Approved.*

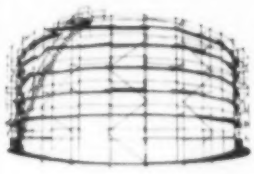
ALUMINUM LADDER SCAFFOLDS

2′ or 4′6″ wide units are built up from ladder frames. Available with 6′, 8′ or 10′ platform. Disassembles for storage. *UL Approved.*



"Trouble Saver"® SCAFFOLDING

For masonry work, plastering overhead repairs, and rolling scaffolds. Goes up and comes down quickly—without tools. Pre-fabricated 5′-wide steel frames joined horizontally with double diagonal bracing make safe scaffold of any height and length. *UL Approved.*



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STEEL OR ALUMINUM

Tube-and-coupler type that's ideal for unusual shapes, curved surfaces, uneven terrain, extreme heights. Only four basic parts needed to make strong, rigid, fire-safe work structure to fit any job.

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THE PATENT SCAFFOLDING CO., Inc.®

38-21 12th Street Dept. SMP, Long Island City 1, N. Y.
6931 Stanford Ave., Los Angeles 1, Calif.
Branches in all principal cities

(For details, use Key # B-21 on card on page 43)

Armco's 1956 company-wide safety contest, is composed of the blast furnace, open hearth shops, coke plant, electric melting shop, scrap preparation department and miscellaneous sections. It captured first place with a record of only two lost-time accidents in 1956 for 3 million man hours worked.

Armco's Houston, Texas, Safety Group IV placed second and Middletown Works' Group II placed third.

• • •

The National Safety Council's Award of Merit has been presented to National Lead Company of Ohio, operators of the Atomic Energy Commission's Feed Materials Production Center at Fernald, Ohio.

The award covers the period August 18 to December 17, 1956, when workers at the atomic energy plant completed 2,230,329 manhours without a disabling injury. A total of 6,058,373 manhours were worked at the Fernald plant in 1956, with two periods of more than 2 million man-hours without a disabling injury and only six time-losing injuries during the entire year. The Fernald plant also received the Atomic Energy Commission's Award of Merit for the same work period.

• • •

Three Scott Paper Company plants have racked up a total of 3,027,000 man hours of safe operation. The plants, located in New York state and Wisconsin, averaged 450 days of accident-free performance.

The Oconto Falls plant, in Wisconsin, for the second time in three years, completed a full year without a lost-time accident and also showed the greatest reduction in accident frequency. The plant has operated since September 15, 1955 —or 473 days—without a lost-time accident.

Plants located in Fort Edward and South Glens Falls, New York, showed accident-free records of 504 and 384 days, respectively.

Sanitation Show

The expanding importance of sanitation maintenance will receive national recognition when the second annual Sanitation Maintenance Show and Conference takes place at Navy Pier, Chicago. Produced by Orkin Expositions Management, nationally known exposition and trade show producers, the Show will be held from October 14–16, inclusive.

Sponsored by the Industrial Sanitation Management Association, Association of Food Industry Sanitarians, and the National Association of Bakery Sanitarians, the Show scored a strong success in New York this past October when 3500 sanitation maintenance executives from 30 states and 10 foreign countries attended.

Many displays at the show will focus attention on the uses and maintenance factors of such products as scaffolding, paints and painting equipment, floor and wall coverings, plumbing equipment,

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OIL SPOTS

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the modern, economical oil and grease absorbents that keep your floors dry, clean and safe, and reduce maintenance costs.

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Oil-Dri CORPORATION OF AMERICA
520 North Michigan Avenue
Chicago 11, Illinois

(Use Key # B-33 on Inquiry Card on page 43)

refrigerating and air conditioning equipment and lighting equipment.

These are in addition to displays of the customarily used products such as: cleaners, disinfectants, skin protectants, polishes and finishes, paper products, soaps and detergents, waste receptacles, floor scrubbing machines, vacuums and power sweepers, chamois, sponges and wiping cloths, insecticides, steam cleaners, dispensers, and vending machines, humidifiers, brooms and brushes, mopping equipment, safety devices, incinerators and dust collectors.

Under the chairmanship of J. Lloyd Barron, Manager of the Sanitation Department of National Biscuit Company, an important series of conferences on sanitation maintenance problems will be held concurrently with the show.

Information about the show and conference can be obtained by writing to Orkin Expositions Management, 19 W. 44th Street, New York 36, N. Y.

Safety Manual

A revised and expanded edition of "Safety Subjects"—now in its fourth printing—has just been released by the U. S. Department of Labor's Bureau of Labor Standards. The volume first gained popularity as a teaching text in training courses for State factory inspectors as well as in college engineering courses.

Plant safety engineers, safety committees, libraries, and others having safety responsibilities are finding the volume a practical aid. Some of the fundamentals it deals with are: Accident costs and causes; responsibility of management; accident reports and records; organization; education and training; inspection; job analysis; investigation; layout and arrangement; housekeeping; materials handling; handtools; electrical hazards; falls; machinery safeguarding; explosion hazards; fire prevention; lighting and color; protective equipment; safety standards; and the State's part in safety.

"Safety Subjects" is issued as Bulletin 67 of the Bureau of Labor Standards, U. S. Department of Labor. It is for sale at $1.00 a copy by the Superintendent of Documents, Government Printing Office, Washington 25, D.C.

Ohio Fights Injuries

A special statewide fight against job-injuries in 1957 has been scheduled by the Division of Safety and Hygiene of the Industrial Commission of Ohio.

The complete program is outlined in a 96-page book the Division has sent to Ohio companies. It presents a month-by-month series of safety meetings designed to make employees constantly safety-conscious.

In addition to the guidebooks, the Division is providing monthly safety posters, safety streamers and wallet cards for all employees. The cards give the year's calendar and these "Ten Commandments of Safety":

1. Learn the safe way to do your job before you start.
2. Think safety, act safely at all times.
3. Obey safety rules and regulations—they are for your protection.
4. Wear proper clothing and protective equipment.
5. Conduct yourself properly at all times—horseplay is prohibited.
6. Operate only the equipment you are authorized to use.
7. Inspect tools and equipment for safe condition before starting your work.
8. Advise your supervisor promptly of any unsafe condition or practice.
9. Report any injury immediately to your supervisor.
10. Support the safety program by taking an active part in safety meetings.

The Industrial Commission has called the new statewide program "The finest of its type any state has ever had." James H. Fluker, Division superintendent, says the program "Aims straight at our central target—the minds of the men and women in our working force."

Each company in Ohio is entitled to receive a free copy of the "All-Ohio" safety manual, plus sufficient wallet cards for all employees and required quantities of the monthly streamers and posters.

Purpose of the program is to further reduce Ohio's industrial injury frequency, which already has been declining for several years.

THE FIRE FRONT

Municipal & Industrial Fire Awards

Memphis, Tennessee, and Vancouver, British Columbia, won the Grand Awards in the United States and Canada respectively for the best 1956 municipal Fire Prevention Week programs submitted in the international Fire Prevention Week Contest, sponsored by the National Fire Protection Association.

In addition to the municipal Grand Award winners, there were the following Grand Awards in the Contest's Industrial and Military Divisions: Milan Arsenal, The Procter and Gamble Defense Corporation, Milan, Tennessee (Industry); Pepperrell Air Force Base, Newfoundland (U.S. Air Force); The Presidio of San Francisco, California (U.S. Army); Naval Ammunition Depot, Hingham, Massachusetts (U.S. Navy); Vancouver Wireless Station, Ladner, British Columbia (Department of National Defense, Canada).

In contrast to the Municipal Division Contest, entrants in the Industrial and Military Divisions competed on the basis of year-around fire prevention activities. A total of 1458 entries were received in the 1956 Contest: 966 in the Municipal Division; 414 in the Military Division; 73 in the Industrial Division; and 5 special entries.

Sodium As a Fire Hazard

Sodium is a soft, ductile metal having a lustrous, silvery appearance. It tarnishes quickly in air. The metal is lighter than water and melts at 208°F. Sodium is combustible, is very active chemically, and reacts with moisture of the air to produce caustic soda and hydrogen. In confined spaces an explosive mixture may result, warns a recent bulletin of the National Board of Fire Underwriters. It is inert to kerosene and other hydrocarbon liquids, but reacts violently with water, generating hydrogen and sufficient heat to ignite the gas.

Due to its reactivity, sodium is used in many chemical reactions to produce detergents, cosmetics, tetraethyl lead for gasoline, pharmaceuticals and drugs, sodium peroxide bleaches, and sodium cyanide. Sodium also has metellurgical uses to improve properties of alloys and to produce sodium hydride for descaling steel and titanium in molten salt baths.

Sodium is valuable as a heat transfer medium at high temperature. It has been used for this purpose in hollow valve stems of internal combustion engines. Liquid sodium or liquid sodium-potassium alloys are used as heat transfer media in various industrial and atomic energy applications. A fire hazard of considerable severity results from such use since sodium, if exposed to air at temperatures above 240°F., will burn and, in large quantities, is difficult to extinguish.

Sodium in large quantities is shipped in specially constructed railroad tank cars. Molten sodium is poured into the tanks and allowed to solidify. At its destinations, it is remelted by built-in heating coils and the liquid metal pumped out.

Sodium is usually handled in the form of sticks or bricks. These blocks of metal come in various sizes ranging from one-half to a foot in length and from one to twelve pounds in weight. They

1956 Fire Losses Soar

Fire damaged or destroyed an estimated $989,290,000 worth of property in the United States last year (1956), the National Board of Fire Underwriters has reported. This is 11.8 percent more than that for 1955, when estimated monthly losses totaled $885,218,000.

According to Lewis A. Vincent, NBFU's general manager, estimated losses for December (1956) totaled $96,485,000, an increase of 19.9 percent over losses of $80,481,000 reported for November (1956) and an increase also of 8.2 percent over losses of $89,212,000 reported for December, 1955. These estimated insured losses include an allowance for uninsured and unreported losses.

FIRE LOSS TABLE

Month	1956	1955	1954
January	$96,972,000	$75,265,000	$86,493,000
February	84,041,000	85,046,000	78,928,000
March	89,315,000	88,197,000	84,821,000
April	84,624,000	78,632,000	77,933,000
May	87,681,000	71,789,000	62,282,000
June	74,770,000	70,828,000	65,533,000
July	68,752,000	61,614,000	69,532,000
August	74,930,000	71,103,000	78,163,000
September	70,118,000	65,970,000	64,087,000
October	81,121,000	58,778,000	57,668,000
November	80,481,000	68,784,000	61,663,000
December	96,485,000	89,212,000	83,881,000
TOTAL	$989,290,000	$885,218,000	$870,984,000

TESTS SHOW YOU'RE SAFER with ACME

. . . . the Gas Mask that Gives You MAXIMUM USABLE VISION

Vision-scope tests made with leading industrial gas masks prove that ACME Full-Vision Gas Masks lead the field in giving the wearer clear, undistorted vision—up, down, and to either side. Along with maximum usable vision, the ACME provides greater comfort, less fogging, minimum breathing resistance and acceptable conversation transmission—all at down-to-earth prices. Write for Bulletin No. 562 on Vision-scope tests and Bulletin No. 541 on gas masks.

ACME PROTECTION GUIDE LISTS 433 GAS HAZARDS AND HOW TO OVERCOME THEM

This practical guide is a *"must"* for industrial hygienists and safety engineers. It lists 433 hazardous gases, mists, fumes, smokes and dusts along with the ACME gas mask equipment to overcome each specific hazard. Write for Bulletin No. 542.

ACME PROTECTION EQUIPMENT COMPANY
1253 KALAMAZOO STREET
SOUTH HAVEN, MICH.
(Use Key # B-34 on Inquiry Card on page 43)

are packaged in watertight metal barrels or drums or in cases containing pails or hermetically sealed tin cans.

A segregated, dry, fire-resistive building or room should be used for storing all sodium containers, both full and empty. The area should not be used for any other purpose than storage of sodium. Water and steam pipes should be excluded; roof and skylights must not leak. The floor should be elevated to prevent the entrance of surface water, and sodium barrels or cases should be stored above the floor to avoid accidental contact with water. Ventilation should be provided to remove possible hydrogen accumulations.

Sodium fires may result from ignition of the metal by other burning materials or by escape of hot molten sodium into the atmosphere. Finely divided sodium will also ignite spontaneously after a short exposure to air. Fire also results from ignition of hydrogen generated by the sodium-water reaction.

Extinguishing Methods

Sodium fires can be extinguished by excluding oxygen; fires burning within a container can often be put out by covering with a fire-resistive lid. The preferred material for extinguishing sodium fires is fine, dry soda ash (sodium carbonate). Fires can be smothered by throwing liberal quantities of this powder over the burning surface. Dry sodium chloride or graphite are also suitable if soda ash is not available. Dry sand will slow up a small fire, but is likely to react with rapidly burning sodium. Covered containers of the extinguishing medium should be readily available at places where sodium is found.

Water, soda-acid, foam, carbon dioxide, or vaporizing liquid type extinguishers should never be used because of the violent reactions which may occur. Signs warning against their use should be posted in all areas in which sodium is encountered. Dry-powder extinguishers containing sodium chloride or soda ash may be used on sodium fires provided nitrogen, not carbon dioxide, is used to expel the powder.

When sodium burns in air, fumes of sodium oxide are given off. These react with moisture of the air to produce finely divided caustic soda which is irritating to the eyes, skin, nose, and throat. A gas mask and ordinary clothing will give a measure of fume protection.

Sodium burns quietly with incandescence but no flame. Sodium fires can be approached by persons with suitable breathing apparatus provided there is no danger of secondary reactions which might result in splashing or spattering of the burning sodium.

The heat released by the burning metal can cause a concrete floor to spall and scatter burning sodium over a wide area. Firemen should wear protective clothing, including respiratory protective equipment having a full facepiece, in locations where sodium may be splashed.

Metal pans are commonly placed under equipment holding molten sodium to prevent contact of burning sodium with concrete floors and as an aid in disposal of residues following a sodium spill.

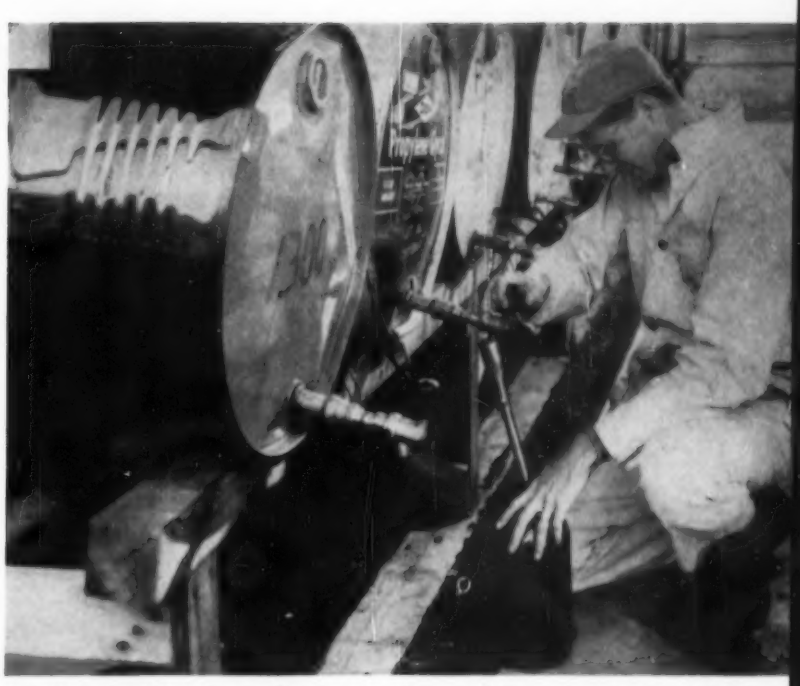
When no moisture is present, contact of the dry metal with the skin may cause no damage. In the presence of moisture the sodium will react, giving off heat which can cause thermal burns and producing caustic soda which can cause chemical burns.

Sodium producers recommend that if particles of sodium get on the skin, they be picked off quickly but carefully, and the affected area flushed with copious quantities of water for 30 minutes.

Protective goggles should be worn wherever there is a chance that sodium particles might enter the eyes. If any should enter the eyes, they should be immediately flushed with water at low pressure for about 15 minutes. Medical attention should be sought at once in any case of injury.

Scrap of waste sodium may be disposed of by burning in an open fire. A fire of oil-soaked rags can be started in a dry, welded steel pan and the sodium added to the fire. Provision must be made to dispel the copious fumes of sodium oxide which are created. The burning mass should be stirred with a dry iron rod. Ashes remaining from the burning operation should be cooled, pulverized, then cautiously sprinkled into water to eliminate all traces of the metal.

This snap-shut drip-proof faucet prevents waste, has flame-arrestor screen.



Quantity of volatile, flammable solvent is drawn off by workman into grounded metal can. Special faucet replaces cocks or valves.

tips on safe solvent storage

Eastman Kodak Company's chemical and solvent storage involves more than 200 horizontally stacked drums of flammable and hazardous materials. Each drum is tapped with a stainless steel dispensing faucet which, besides being resistant to corrosion by contact with solvents, also has a fluoro-carbon seal that provides drip-proof closure and resistance to swelling and contamination. On release of manual pressure, a positive, snap closure is made, with an absence of metal-to-metal contact, and the flame-arresting strainer gives additional fire protection.

Although, in some instances, many months may elapse between the withdrawal of some of the chemicals, the non-swelling feature of the seals have ensured that every time one of the push-pull faucets is opened, a clean, controlled flow results. The snap-shut, dripless closure is an aid to good housekeeping and the elimination of fire and toxic hazards.

Solvent drums are shown here alongside a drainage trench which removes spilt solvent, also draws off and extinguishes any burning fluid.

Kodak's standard preventive techniques consist principally of improved and more efficient storage arrangements and mechanical innovations to reduce the hazard of handling flammables. For example, the company has erected an open-air shed-roof type of construction to minimize the accumulation of noxious and explosive fumes and to provide the exposed racks of 55 gallon drums with the necessary protection against rain, snow and sunlight.

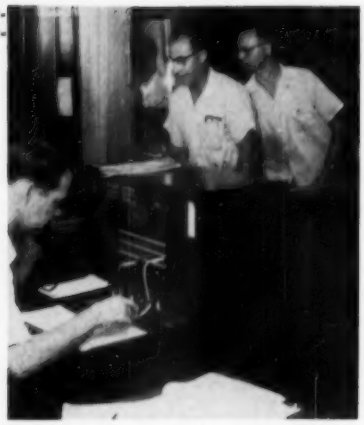
Sprinkler Systems

Underneath and over the racks are all-weather sprinkler systems which withstand sub-zero temperatures but can still provide a pressurized water spray along any section of its length activated by a released sprinkler head. The racks are constructed of heavy, treated

(Continued on page 78)

Fire Drill!

Office staff hastens to their pre-determined tasks when alarm sounds for presumed fire at loading rack.



Fire Call: . . . . . Switchboard operator calls municipal fire department . . . then locks safes and returns to post.

Safety Shut-Offs: . . While some personnel close valves on storage tanks . . . others shut off electricity to loading racks . . . .

Fighting The Fire: . . . . . Fire teams pull foam-type extinguisher to loading rack . . . while others bring up the hose cart . . . .

"Petroleum products are highly flammable. Each act of carelessness is fraught with danger. Therefore—BEWARE OF FIRE. . ."

With these introductory words of caution, fire prevention procedures are detailed in the Texaco Domestic Sales Department's manual of operating instructions for terminals and bulk stations, where large bulk quantities of petroleum products are stored and handled. Fire drills are mandatory.

The men who man the company's big Twin Cities Terminal at St. Paul, Minnesota, never know when the piercing shriek of the terminal's siren will sound a drill call. Because fire—if it should strike—will do so unexpectedly, Terminal Superintendent N. J. Mathieu stages fire drills without advance notice. The pictures on these pages show what happens. In less than two minutes, the full blast of the fog nozzle is smothering and cooling a presumed fire at the loading rack with a dense spray of water. The drill's objective is to train the terminal staff on containing or localizing a fire until municipal fire fighters arrive.

At Twin Cities Terminal, the drills conducted by Mathieu, an ex-Marine, have won the respect and interest of the local fire department. As many as 22 fire captains and lieutenants have visited the plant at one time to familiarize themselves with firefighting problems and techniques.

The speedy and precise teamwork, starting the instant the fire drill is sounded, presents stirring evidence of how well the property is being safeguarded. "The boys are really on their toes," Mathieu says. Here, as in other aspects of the company's operations, every effort is made to prevent fire from getting a start—and to be prepared in case it does.

Courtesy of The Texaco Star

. . drive trucks from yard or close garage doors.

. . . . . and apply fog to theoretical fire . . . . . all in one minute and forty-five seconds after the alarm sounded.

Maintenance Show
(from page 37)

A few years ago we stocked many types of lubricants, with little information as to their interchangeability. In 1954 we reviewed our lubrication schedule and set up specifications to cover eleven viscosity grades. For greases, we now carry two general purpose greases where we formerly had 33. Our specification numbers include the oil grades of several approved vendors.

● *Food Processing Plants*—Charles H. Pelton, chief chemical engineer, Clinton Corn Processing Co. division, Standard Brands, Inc., Clinton, Iowa.

Ours is a corn wet-milling plant and one of the principal maintenance problems is corrosion. Here are some of the ways we have overcome corrosion problems: 1. Substituting cast bronze disks for the former cast steel disks in our disk-type mills where sulfurous acid is encountered. 2. Using stainless steel screws instead of cast steel screws in the moisture expelling screw presses. 3. On the wet-feed screw conveyors, changing the wood conveyor boxes and mild steel conveyors to stainless steel boxes, screws and gudgeons. 4. Using stainless steel and some nickel-clad evaporators. 5. Substituting tanks made of polyester resins for steel tanks. 6. Using corrosion-resistant valves of bronze, type 316 stainless steel, or #20 alloy. 7. Coating the interiors of railroad tank cars with aluminum pigmented varnish (and we are now experimenting with a baked-on phenolic lining).

● *Steel Mills*—John R. Lewey, assistant superintendent, mechanical department, Cleveland District, Republic Steel Corp., Cleveland, Ohio.

Steel mill maintenance is usually divided into mechanical, electrical, mason and labor. We have certain maintenance crews that are assigned to specific operating units or departments and there are also maintenance shops that service the entire plant.

The Coke Plant has a series of rubber conveyor belts that require continuous clean-up. The crushers, larry cars and other auxiliary equipment are set up so a unit can be taken out for repairs by putting extra load on the other units.

Because of corrosive and flammable gases and liquids in the By Product plant, explosion-proof electrical equipment must be used. Stand-by gas blowers, compressors and pumps must be ready to take over if one unit gives out. Rigid maintenance is required on ovens to prevent air contamination and dangerous wastes to the sewers.

Each Blast Furnace is continual operating and every part must be put in first class condition during the periodic relining of the furnace brick every four to six years. Improvements in ceramic materials have made the thorough maintenance of the rest of the furnace during the shutdown even more im-

BE READY FOR
ACTION!
WHEN FIRE STRIKES

CLOSED

The GARDWELL Fire Blanket Container is fast and easy to operate. Use it to smother fires or for first aid cases. Pull the release and the 66" x 84", 4 lb. woolen blanket slides out instantly. The container is painted a bright red and is designed for easy hanging. ASBESTOS BLANKETS ALSO AVAILABLE.

PULL THE RELEASE —BLANKET DROPS! YOU'RE READY!

OPEN

HOW TO ORDER

		EACH
1940	— Container and Woolen Blanket	$17.50
1941	— Container and Asbestos Blanket	32.10
40	— 66"x84" Woolen Blanket	8.50
41	— 66"x80" Asbestos Blanket	23.45
19	— Container only	8.65
190DM	— Container — Outdoor Model	9.25

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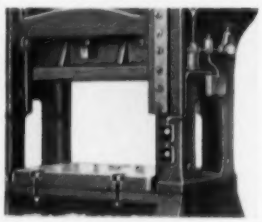
GARDWELL Products

Safety CLOTHING & EQUIPMENT Co.
1990 EAST 69th ST. • CLEVELAND 3, OHIO

(For details, use Key # B-35 on card on page 43)

SEARJEANT Safety GUARDS



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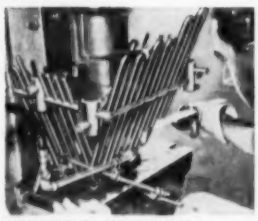
FREE
TRIAL



TWO BUTTON ELECTRIC CONTROLS
For PRESSES and BRAKES

Guards Designed and Made By Searjeant

ADJUSTABLE BASKET GUARD
Enclosure type guard, used for blanking and other first operation work, prevents operator from reaching in or coming in contact with moving die. Easily installed on any make punch press. Also available with clear plastic window. Write for free catalogs.

Adjustable Basket • Single Sweep • Double Sweep • End Zone Barrier • Non-Repeat Mechanisms Milling Machine • Flywheel and Belt • Push Button Electro-Solenoid or Electro-Pneumatic Controls Electro-Solenoid or Electro-Pneumatic Drop Gate Guards • Photo-Electric Controls

SEARJEANT METAL PRODUCTS, INC. No. 12 Pittsford Rd., Mendon, N.Y.

(For details, use Key # B-36 on card on page 43)

portant. This has led to the use of more abrasion resistant alloys and heavier plates on wearing chutes and of hard surfacing of valves and other major parts.

The Open Hearth furnaces have to be rebuilt every three months, replacing burnt away brickwork, steelwork and water-cooled auxiliaries. Routine maintenance is required on the overhead cranes, chargers and other handling equipment.

The chief job of the steel maintenance man is the Rolling Mills, which are in round-the-clock operation and require regular shutdowns, weekly or biweekly. Here we have to anticipate troubles to a great degree. Extremes of heat and load conditions make the rolling mills create lubrication problems. Pit cranes require steady maintenance and the pits give masons a full time job. The blooming mill needs constant attention, especially the mill itself, the tables, the manipulators and the shear.

Because of the precision rolling done in a strip mill, roller bearings must be inspected regularly and the rolls changed frequently. In Cold Mills the need for precision is even greater and rigid cleanliness must be enforced.

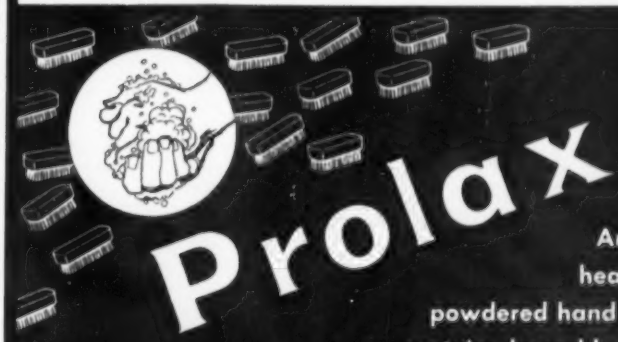
The auxiliaries of the steel mill, such as the boiler house, power station, railroad equipment and all types of materials handling devices, are also a big maintenance job.

● *Metal Working Plants*—W. A. Irvine, manager of production engineering, Maytag Co., Newton, Iowa.

Maintenance problems are complicated by the diversity of our manufacturing operations and they also require an increasing degree of specialization. Our craftsmen are divided into eight major groups: electricians, building mechanics, plumbers & pipe-fitters, millwrights, metal-workers, buildings & grounds men, carpenters, steam boiler operators and compressor men. Our force is large enough to deal with ordinary peaks of emergency work and to fill in their time with routine maintenance, installation of new equipment, equipment moves, or new construction. Excess work is given to outside contractors.

Effective, planned maintenance is the best assurance of continuity

Soap and brush action without any brush



Prolax

Antiseptic
heavy-duty
powdered hand cleaner
contains hexachlorophene

Borax scrubber in Prolax powder acts like millions of fine tiny brushes. Makes stubborn grime vanish quickly.

Its hexachlorophene, through regular use, builds an invisible film on the skin that reduces by as much as 95% the resident bacterial population.

Correct for both shop and office; popular with both men and women.

Protect your valued employees from dermatitis with this heavy duty cleanser that is so kind to the skin.

For free sanitary survey of your premises ask your Dolge service man

Expendable DOLGE
WESTPORT, CONNECTICUT

(For details, use Key # B-37 on card on page 43)

Some just COVER THE LAW
CARPENTER-LIGHTS
give real PROTECTION

Life and limb are at stake when you buy emergency lights. Investigate . . . then invest in CARPENTER-LIGHTS!

"AUTOMATALITES"
The finest protection against panic and injury. Automatically, instantly, illuminates large areas or pinpoints critical controls with two powerful, sealed-beam floodlights. Essential wherever people congregate or where vital operations must go on. Many types, including explosion-proof and remote control, available. U/L APPROVED.

"PORTALTES"
For applications requiring high-intensity, portable searchlights or work lights, CARPENTER'S "Portalites" are highly recommended. Many types and sizes to choose from. Illustrated model has rechargeable battery and two-way switch giving choice of mile-range searchlight or 24 hour continuous work light.

CARPENTER Makes: "Portalites" "Automatalites" Stationary and Automotive beacons
Automotive Spotlights Marine Lights and many others

NEW! "HYDRO-CAPS" Send for details about these marvels that return the water to your batteries. Cuts maintenance costs, prolongs battery life. Send coupon below.

CARPENTER
Manufacturing Company
312 Bradley Street
Somerville 45, Mass.

Send details on: ☐ "Portalites" ☐ "Automatalites"
☐ Complete Catalog ☐ New "Hydro-Caps"
Name ..... Title .....
Company & Address .....

(For details, use Key # B-38 on card on page 43)

Store Safely

gasoline • kerosene
or any flammable liquid!

VENT-A-DRUM
automatic
SAFETY VALVE

protects against dangerous explosions!

The Vent-A-Drum *prevents* dangerous explosions which occur from fires and sudden temperature changes when storing flammable liquids, by automatically allowing air to enter or escape container. In addition to protecting property and lives, Vent-A-Drum pays for itself by reducing fuel evaporation 50%! Used by leading firms, approved by Factory Mutual Testing Laboratories. Precision-engineered, never requiring adjustment or replacement of parts. Cast Bronze. Completely guaranteed.
Dealerships and literature available.

CENTRAL Safety Equipment Co.
6602 MARSDEN ST. PHILA. 35, PA.
(use key # B-29 on Inquiry Card on page 43)

WRITE FOR LATEST CATALOG SHOWING
SAFETY SIGNS FOR ALL PURPOSES

STANDARD SIGNS, INC.
3192 E. 65th St. • Cleveland 27, Ohio

(Use Key # B-40 on Inquiry Card on page 43)

of production, especially in view of the growing importance of greater mechanization of machining and the grouping of machines in production lines. But unless maintenance is carefully planned, the cost can be high: scheduling must be planned, workmen must use the best methods and equipment, their performance must be measured by pre-determined time standards, inventories of materials and parts must be controlled, costs must be analyzed so that excessive ones can be reduced.

With each craft foreman we now have a planner, with craft experience and supervisory potential. The foreman and planner agree on how each maintenance job should be done. The planner then makes a detailed plan, estimating the number of men, hours, materials and the cost. He fits the job into the craftsmen's schedule, co-ordinating with other planners when necessary. The work of the planners allows the maintenance supervisors to concentrate on training and supervision and the improvement of methods and equipment. During or after the job, the Industrial Engineering Department computes the time the job should have taken and compares it with the time actually required.

• *Chemical Plants*—G. Standish Beebe, plant engineer, Chas. Pfizer & Co., Inc., Groton, Conn.

For some time now, we have abandoned the policy of hiring in more experienced mechanics for expansion or replacement, preferring to promote from the trade those who are qualified for advancement. We've set a battery of tests to determine the mechanical aptitude and general suitability of potential candidates for engineering jobs.

Another important factor in a chemical and pharmaceutical plant is the keeping of necessary materials, tools and replacement parts. Since our plant is not too near a metropolitan area, we tend to keep somewhat more mechanical stores on the premises. We have a mechanical stockroom (wide range of pipes and fittings), electrical stockroom, tool room and spare parts warehouse.

We try to schedule everything we can, but at present this doesn't amount to much more than 20 percent of our jobs, except for the annual shutdown. We hope to convince management that an efficient work scheduling group will pay off in spite of the extra overhead.

We have essentially a centralized maintenance plan, and although not everyone is in complete agreement, I feel that centralized control is better than having our force split into small area groups at the beck and call of their unit's production people while their neighboring departments may have a greater need for their services.

• *Foundries*—S. A. Simonson, plant engineer, Chicago Hardware Foundry Co., North Chicago, Ill.

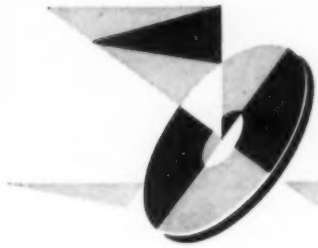
Observations by the operators of equipment are helpful in preventing breakdowns, but inspections by the technically qualified are the most valuable in preventive maintenance. Our inspectors are actually the maintenance foreman, area mechanics, lubrication man, production foremen, etc. Frequency of inspection depends on the importance of the equipment, hours of operation per day, and type of equipment.

Our biggest problem is how to cut maintenance costs in grit and shot blasting equipment. The manufacturers are making progress in improving the life-span of the wearing parts, but much still depends on the operator of the equipment: he should keep the table covered with castings, detect unusual noise indicating bearing wear in the shot wheels, notice excessive lining wear, and see that the exhaust system is working properly.

The fewer kinds of lubricants you can use the better. We tag our motors to show lubrication dates and give a check list to our lubrication men.

Foundry building maintenance is chiefly an interior problem. Concrete floors get rough usage. We use steel plates or gratings where necessary.

Picture by the courtesy of General Electric Co.



transportation safety

Recommendations for Driver Licensing

Recommendations by 125 leading medical and traffic safety authorities for establishing new mental and physical driver licensing requirements were published recently in the "New York State Journal of Medicine."

The proposals are contained in the report of the Symposium on Medical Aspects of Motor Vehicle Accident Prevention held last spring at the New York University-Bellevue Medical Center. Co-sponsors of the Symposium were the Medical Center and NYU's Center for Safety Education.

The participants were divided into three major groups to consider (1) psychiatric-psychologic aspects, (2) organic medical aspects, and (3) drug and chemical aspects. Their principal conclusions and recommendations follow:

• Driver attitudes and personality characteristics are a major factor in traffic accidents; research in this area must be continued and intensified.

• If alcohol is detected by chemical tests when a driver is involved in an accident, or if he refuses to take a test, a demerit mark should be placed on his driving record. In case of a second accident, if alcohol is again detected or if the driver again refuses to take a test, his license should be indefinitely suspended and his drinking habits investigated by a clinician appointed by the authorities.

• Qualifying medical examinations should be mandatory before the first issuance of a license to an individual. Periodic screening and other types of examinations are desirable for older people.

• Persons with any of 14 cardiovascular conditions, ranging from severe diminished cardiac reserve to fixed hypertension above 180/100, should be disqualified as drivers.

• Individuals subject to epilepsy and other conditions that bring about transient lapse of consciousness or loss of motor control should be periodically examined to determine their fitness to drive, and the motor vehicle commissioner should have the assistance of a panel of specialists for purposes of evaluation.

• The minimum visual requirements for private car operation should be a correctible visual acuity to 20/40 Snellen in one (the better) eye and a form field of 70° in the horizontal meridian in each eye, or 140° in one eye, with vision to be reexamined every three years.

• Certain conditions of the head and neck, diseases of the thoracic cage, limited functions of arms and legs, and certain conditions of the spine should be considered as precluding the safe operation of motor vehicles.

Dr. George E. Armstrong, vice president for medical affairs at NYU and conference chairman, points out in the report that relatively little consideration had been given previously to the medical aspects of motor vehicle accident prevention. Dr. Herbert J. Stack, director of the Center for Safety Education and coordinator of the Symposium, describes the meeting as "a pioneer effort in accident prevention."

Reprints of the proceedings can be purchased from the Center for Safety Education, New York University, Washington Square, New York.

Safety Belts Save

The Northern Illinois Gas Company, which operates more than 400 business cars in its 10,000 square mile territory, had auto safety belts installed seven months before an occasion to test their usefulness presented itself.

Then, in a grinding crash on a highway near Morris, Ill., the belts proved their worth, saving two valuable employees from serious injury or possible death.

Traveling at a moderate rate of speed on company business in a two-door sedan, Ed Culp, driver, and Pat Warrick his passenger, suddenly hit a section of "patch" ice on an otherwise dry highway. The vehicle veered across the road, hit and jumped a concrete culvert and spun around against a tree. The two men emerged from the badly damaged automobile with only minor cuts and bruises.

The company's safety supervisor, Joe Lambert, in reviewing the accident said, "Fortunately no one was seriously injured. It is apparent the seat belts had a great deal to do with their escape. I sincerely hope a report of this occurrence will influence employees to use the seat belts at all times."

The Northern Illinois Gas vehicles are each driven approximately 1,500 miles per month in handling business between divisions, service calls, meter reading, claims department and sales division business.

A Belt in Time

An Air Force lieutenant didn't have to wait seven months to have his auto safety belt prove its worth. Lt. Billy J. Yeiser, assigned to the 98th Air Refueling Squadron at Lincoln AFB, Nebraska, has cred-

ited an automobile seat safety belt with possibly saving his life. His late model automobile was struck head-on by another vehicle which was in the wrong lane and passing on a curve in a no-passing zone. Yeiser had just installed the safety belt less than 24 hours before the accident.

Yeiser stated that had the belt been drawn tight he might have escaped even the minor injuries he suffered. He received a broken nose, face and neck lacerations and a bruised chest. In the other car, two children lost their lives and six other persons were critically injured.

The Yeiser vehicle was traveling at an estimated 20 m.p.h. while the other automobile was moving at an estimated 60 m.p.h.

Many Air Force Base Exchanges are now offering the safety belts for sale and Ground Safety officials have strongly encouraged their use in privately owned vehicles.

Research: What Causes Vehicle Accidents?

A three-year research project to find what personal traits lead to auto accidents and a study to develop better tests for driver licensing have been launched by New York University's Center for Safety Education. The research has been made possible by a $50,000 grant from the Shell Oil Company, Dr. Herbert J. Stack, director of the NYU Center, announced.

Tests to be developed include personality and attitude tests that can be used in driver licensing or in driver rehabilitation programs.

"A great deal of research has been conducted on safety problems pertaining to vehicles and highways," Dr. Stack said, "but far too little has been directed toward the driver. Relatively few studies have explored drivers' personal characteristics and their possible relationship to accidents. Also, too little is known about accident repeaters and chronic violators."

The new driver research project will be headed by Dr. Leon Brody, director of research and publications at the Center.

Solvent Storage
(from page 71)

timbers which give firm, balancing support to the heavy drums and permit their unhindered removal and replacement.

All drums rest on copper strips to ground them against static sparks. They are clipped to ground lines, as an extra precaution during the withdrawal of solvents, and are also clipped to metal containers into which the solvent is being poured.

A monorail and hoist system eliminates most of the heavy labor involving the movement of drums, and each solvent is assigned to a regular berth to eliminate hunting.

A deep trench, running down the center of the solvent storage facility and beneath a steel grating, was excavated to drain off solvent spill or, in the event of fire, to lead burning solvent away. A tank trap into which the trench drains is designed to snuff out flaming solvent before it sweeps into the plant's industrial sewer. Up to 2500 gallons of water per minute can be handled, which is sufficient to exhaust the total volume of water spilling from the sprinkler system.

Pictures by courtesy of Eastman Kodak Co. through Economy Faucet Co.

How Safe Is Built-In Safety

Built-in safety will receive increasing attention in 1957 as industry moves into the Age of Instrumentation and Automation, according to John T. Ryan, Jr., president of Mine Safety Appliances Company, Pittsburgh, Pa. Mr. Ryan warned, however, that industry should guard against over-reliance on environmental safety, at the sacrifice of traditional safety procedures and equipment.

Safety statistics through the years, he said, reflect the gradual acceptance of safety standards and equipment throughout industry. Now, he said, we are moving into a period when instruments, and factory and machinery design, are considered from a safety aspect, as well as from the production viewpoint.

"But, as a result of environmental safety programs we may be faced with a new hazard, the lessening of individual caution," Mr. Ryan said.

With environmental safety equipment, there is a possibility that workmen might grow careless in the use of traditional personal safety equipment, such as protective helmets, respirators, masks and clothing. Although process control instruments and factories designed with safety in mind will undoubtedly add to industrial safety progress, the individual workman will still be responsible for following safe practices and using all the personal safety devices and equipment available to him.

Safe Driving Guide

A practical and useful book on safe driving techniques on superhighways has been written by Paul W. Kearney and entitled, "I Drive the Turnpikes and Survive." It is published by Ballantine Books in a paperbound edition at 35 cents and a hardbound edition at $2.75.

Based on the premises that Jet Age driving is as different from conventional driving as flying is from walking, and that driving skill has not kept pace with the engineering of our superhighways and our powerful cars, he offers many new, practical, and sometimes startling suggestions for good driving practices. Extensive research has produced new ideas on highway hypnosis, faulty vision, diet for the traveler, safety devices, "stay-awake" drugs; new techniques for headlights and rear-view mirrors, accident procedures—new habits and new attitudes to deal with new realities.

Correction

In the summary of the speech by Earl R. Wallace, Senior Safety Engineer, Eastman Kodak Co., at the National Safety Congress (on page 58 of the December 1956 issue), the speaker was misquoted as saying that ether was nonflammable but toxic. Ether is both flammable and highly toxic, as Mr. Wallace stressed in his address.

inside the trade

SAWYER-TOWER, INC. has elevated *William A. Reilly* to the office of executive vice president, according to an announcement by *Jacob Saliba*, president of the protective clothing manufacturing company.

New Hillyard Building

1957 marks the 50th Anniversary of the *HILLYARD CHEMICAL COMPANY*, manufacturers of floor treatment and floor maintenance products. The company was founded in 1907 by N. S. Hillyard, in St. Joseph, Missouri, present location of its main offices and plants.

The new six story Hillyard office building will contain executive offices and the present office space will give way to greater manufacturing accommodations.

WIRE ROPE CORPORATION OF AMERICA, of St. Joseph, Missouri, has appointed *David P. Hornaday* to the newly-created position of Advertising Manager, according to an announcement by *James Josendale*, President. Hornaday was formerly an account executive with Ayres, Swanson and Associates, Inc., Advertising Agency. He attended the University of Missouri.

Raymond Burrows has been named sales manager of the Hazard and Portable Lighting Division of *R. E. DIETZ COMPANY*, Syracuse, New York, according to *Gerry J. Dietz*, president of the firm.

Mr. Burrows, who joined the Dietz firm in 1951, served as assistant sales manager of the division and assistant to the president.

THE HEWSON COMPANY, INC. has announced the appointment of three additional representatives to handle sales, field application and servicing of its line of high voltage insulation test sets and power supplies, static control systems, static detection and warning systems, and ground controls: *Thomas H. Closs*, 21 West Pennsylvania Ave., Towson 4, Md.; *Dittman & Greer, Inc.*, 33 Pleasant St., Middletown, Conn.; *Honolulu Electrical Products Co., Ltd.*, 930 Clayton St., Honolulu, Hawaii.

INDUSTRIAL WIPING CLOTH CO., INC., Long Island City, N. Y., announces the appointment of *Walter Rittenberg* as new district sales manager for its five-state, north central territory. Making his headquarters in Detroit, he will be in charge of sales in Ohio, Michigan, Pennsylvania, Delaware, Maryland and the District of Columbia.

Paul H. Carlson has been appointed advertising manager for *THE BABCOCK & WILCOX COMPANY, Tubular Products Division*, Beaver Falls, Pa., it was announced by *James S. Anderson*, general sales manager of the division.

Mr. Carlson, who has been nominal head of this activity, will be responsible for all sales promotion and advertising activities within the division.

Harvey Childs, Jr.

IRON AGE SAFETY SHOE DIVISION, H. Childs & Company, Inc., Pittsburgh, Pa., has announced that *Harvey Childs, Jr.*, formerly Assistant Sales Manager, has been named Sales Manager.

R. H. Childress, Sales Manager of *SECO SAFETY PRODUCTS CO.*, announces the appointment of *Tom A. Conley* as Safety Products Specialist, a new position with the firm. He will be responsible for acting on the needs of industry for new or improved safety products; training personnel on proper use of safety equipment; providing help on plant safety surveys, goggle fitting programs, breathing hazards, and other customer services that will coordinate the efforts of the

★ THE POSITIVE LADDER SAFETY DEVICE

It locks automatically—instantly—holds.

SAFETY DEVICE FOR LADDERS

Prevents death and injuries from falling.

Automatic: Positive. Will catch workman if he starts to fall even if unconscious.
Inexpensive. Easy to install. No upkeep. Clamps to any rung ladders, peg ladders, pole or frame. No welding or cutting.
Simple to operate: Requires no attention from climber.
Notched rail **hot dipped galvanized.** Entire equipment rust and corrosion proof.
In use throughout country and abroad for approx. 8 years.

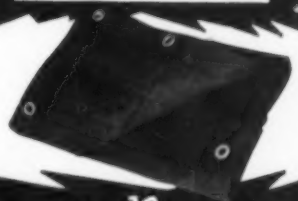
Patented. Manufactured only by

SAFETY TOWER LADDER CO.
1034 Burbank Blvd. P.O. Box 1052
BURBANK, CALIFORNIA

★ ★ ★ ★ ★

(Use Key # B-41 on Inquiry Card on page 43)

CONFINE YOUR DANGER!



USE Reeves FIRE CHIEF TREATED WELDING CURTAINS

- close woven canvas
- weighs 10 ounces per square yard before treatment
- impregnated with Hooper's Fire Chief treatment under their patent
- Underwriters Laboratory approved

The perfect protective curtain for all your dangerous work.

A. SMITH & SON, INC.
"IF IT'S MADE OF CANVAS, WE MAKE IT"
Green & Ridge Ave. Philadelphia 23, Pa.

(Use Key # B-42 on Inquiry Card on page 43)

supplier with the user to get maximum results from his safety equipment.

Mr. Conley is widely known in the industrial safety field having started as a safety inspector in a shipyard in 1941 and with the exception of the time spent in the Air Corps during World War II he has been associated with the use, manufacture, and sales of safety equipment during his entire business career.

THE MODERN POWER SWEEPER CO., of Azusa, California, has announced the appointment of *Melvin E. Runner* as sales manager of the power sweeper company. He was formerly with the Dayton Rubber Company for 17 years, serving variously as sales representative in the Northwest states; West Coast manager of all Dayton products; and, finally, national sales manager of the Industrial Wholesalers Division.

FOUR WHEEL DRIVE AUTO CO., manufacturer of custom-engineered four and six-wheel drive trucks, has promoted *Victor M. Anderson* to assistant to the vice president-sales and *Fred A. Brown* and *Robert J. Peterson* to assistant sales managers.

Anderson, with FWD since 1936, has supervised the Clintonville sale office as sales administrator the last four years. He previously functioned in purchasing and field sales capacities.

Brown, who will be in charge of district sales managers in FWD's Eastern Division, has spent 19 years in the FWD organizatioin, much of the time as a district sales manager in the midwestern area.

Peterson entered the FWD firm earlier this year as a district sales manager in the Northwest, after nine years in truck sales with another company. He will supervise FWD's Western Division sales staff.

Safety Appointments

Dr. Irving R. Tabershaw, one of the nation's leading authorities on industrial health and safety, and since 1953 director of the Division of Industrial Hygiene, New York State Department of Labor, has joined Nuclear Development Corporation of America, White Plains, N. Y., as director of health and safety.

Dr. Tabershaw will be a pioneer in his new role since the company is the first nuclear concern to employ a medical specialist to review both its own operations and its work for clients from the standpoint of health and safety.

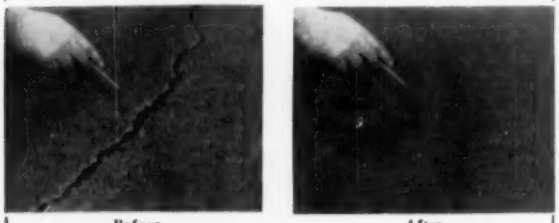
He will continue to do a limited amount of consulting work in the field of industrial medicine and will continue as associate professor of occupational medicine in the Columbia University School of Public Health and Administrative Medicine.

Earl A. Rinker has been appointed safety director of the Rock of Ages Corporation, Barre, Vermont. The company operates four granite quarries and a manufacturing division. Rinker was formerly manager of the company's Number Two plant and has been a member of the company's executive safety committee since 1949.

Moody Covey has been promoted to safety supervisor of Tidewater Oil Company's 7-state and Hawaii western division, Thomas L. Wark, vice president and western general manager, has announced. Formerly safety supervisor of the southern division, he replaces Samuel O. Bacon of Concord, California, recently deceased. Covey's headquarters will be in San Francisco.

New Plastic Material Repairs Floor Cracks!

A new plastic material formulated for the specific purpose of repairing floor cracks and preventing surface deterioration is announced by The Monroe Company, Inc., Cleveland.



Before After

Known as "Jiffy Floor", it is a fine granular, ready-to-use plastic product that can be applied without interfering with production or traffic. It readily fills hairline cracks, shallow holes, spalled floors or expansion joints. Immediately after application, it will withstand heaviest loads.

Jiffy Floor contains no asphalt, cement, sand or gravel. It will not crack, crumble or curl . . . is not affected by temperature changes . . . can be applied indoors or out.

Jiffy Floor is waterproof, dustless, skid-proof and noiseless. Available in 5-10-30 and 55-gallon drums, ready for easy use. For further information, write *The Monroe Company, Inc., 10713 Quebec Avenue, Cleveland 6, Ohio.*

(For details, use Key # B-43 on card on page 43)

Will there be a vaccine against cancer?

It may depend on you

The other day scientists vaccinated a horse with dead cancer cells from 56 human cancer patients. The horse developed antibodies against cancer. These antibodies then killed live human cancer cells in a test tube.

Will this vaccine stop cancer? Only research will find out. And research takes money.

Give to your Unit of the American Cancer Society, or mail your gift to CANCER, c/o your town's Postmaster.

American Cancer Society

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To obtain descriptive literature of products listed, use Reader's Inquiry Card. Write in code number given each item. Send written requests to: Service Dept., SAFETY MAINTENANCE.

what's new for MARCH

SPRAY-BATH SHOWER SYSTEM

(Use Key # 775 on Inquiry Card on page 43)

HUNTINGTON Spray-Bath, a new personal cleanliness system for use with all institutional and industrial shower bath installations, has been introduced by Huntington Laboratories, Inc. The Spray-Bath machine, which can be installed easily in any shower room, delivers a jet of gentle, thorough-cleansing Spray-Bath Liquid at the touch of a fingertip. Not only is the safe, sanitary system convenient for bathers, but it eliminates sticky shower floors that result from ordinary cleansing agents. The Spray-Bath installation, which includes motor, compressor, tank and self-timing valves, is designed for use with Huntington Spray-Bath Liquid exclusively.

The Spray-Bath Liquid gives a rich lather which quickly removes dirt and grime. Since it is very mild, it will not irritate tender skin; it rinses off easily, leaving no sticky film. The amount of liquid dispensed in ¼ second is said to be sufficient for a complete bath, and one gallon of the cleanser mixed with eight gallons of water is enough for approximately 1500 showers, the company states.

DUST RESPIRATOR

(Use Key # 776 on Inquiry Card on page 43)

THE U. S. BUREAU of Mines has issued Approval No. 2170 to a new respirator for protection against dusts, pneumoconiosis producing mists and chromic acid mist. The new respirator, introduced by the Willson Products Div., Ray-O-Vac Co., is called the No. 600 MonoMask. Integrally molded of resilient natural rubber, its one-piece construction and the smooth contour of the facepiece make it easy to clean. The new respirator uses a single filter of treated felt which offers high-filtering efficiency and long life. The filter is held in position by means of a nylon retainer which requires no clips or fasteners to hold it in place.

The MonoMask has no metal parts to dent or scratch, and no exposed plastic parts. The headband is attached to the front of the facepiece to provide a reverse-lever action for a firmer, safer fit against the face. Positive-action inlet and outlet valves insure uninterrupted ease of breathing. The pleated construction on the top of the facepiece assures a close fit around the bridge of the nose without uncomfortable pressure. Spectacles or goggles may be worn with the mask.

MOLDER'S CUSHIONED SAFETY SHOES

(Use Key # 777 on Inquiry Card on page 43)

EXTRA FOOT comfort is said to be provided in the new Cushion Molder's Shoe by an insole from heel to toe with a built-in pad that supports the metatarsal arch and cushioned longitudinal arch support, according to the manufacturer, the Bronson Shoe Co. The Finger-Soft Air Cushion insole is a one-piece resilient cushion extending from heel to toe and covered with one piece of leather. These rubber cushions, which are 60 percent air, absorb most of the impact of walking and provide a comfortable cushion to stand on. The cushioned longitudinal arch support is a part of the cushion insole and provides a restful support from heel to the ball of the foot. The metatarsal pad, also built into the cushion insole, supports the transverse arch to help prevent callouses.

Another comfort feature is the Winguard steel toe box which is designed to prevent the back edge of the box from pinching the toes. The long base of this box forces the shoe to break back of the top edge in walking. This prevents pinching and gives added protection against injury.

HEAT & GLARE CONTROLLING GLASS

(Use Key # 778 on Inquiry Card on page 43)

TWO NEW GRAY glasses, a true heat-absorbing gray plate glass known as Solargray and a gray heavy sheet glass called Pennvernon, have been announced by Pittsburgh Plate Glass Co. Solargray is a neutral gray polished plate glass possessing heat absorbing characteristics as defined in Federal specifications. In ¼" thickness, the glass transmits approximately 45 percent of total solar radiant energy. Transmission of visible light has been reduced to approximately 40 percent. According to the company, the new glass is said to provide excellent brightness or glare control, solar heat control with a pleasing neutral color, elimination of architectural problems in daylight, for interior planning, and a change in the appearance of environment-controlling glasses. The product, said to have excellent stability equivalent to regular plate glass is intended for use in office buildings, apartments, private residences, commercial, and institutional installations. It may also be used in double-glazed insulating windows. Available in cut sizes up to 75" x 128".

Pennvernon Gray Heavy Sheet Glass is a neutral gray glass furnished in 3/16" and 7/32" thicknesses up to a maximum sheet size of 70" x 126". The sheet glass product provides brightness or glare control, transmitting only 53 percent of visible light. It also provides a significant reduction in the transmission of heat-controlling solar energy, although it is not a heat-absorbing glass in terms of Federal specifications. Both Solargray and Pennvernon glass are now standard company products with long range availability for replacement purposes.

JUMBO WELDING GOGGLES

(Use Key # 779 on Inquiry Card on page 43)

NEW "JUMBO-SIZE" welding goggles have been announced by the Sellstrom Manufacturing Co. Offered in two different styles, both goggles are said to be large enough to be worn comfortably over the welder's personal glasses. The principal difference between the two goggle styles, according to the manufacturer, is found at the nose bridge; one pair has an adjustable bridge for extra close fit, while the other (as shown) has an additional rigid brace-bar joining both eye cups so its wearer can raise the goggle with one hand.

Eye cups of these new goggles are said to be thermosetting plastic, and they are claimed to have good ventilation around the eye cups. A choice of lenses is permitted with the glass meeting all commercial or federal specifications for safety and vision. The goggles have been designated the No. 618 series for the flexible bridge and No. 620 for the rigid bar bridge.

FLOOR PATCHING COMPOUND

(Use Key # 780 on Inquiry Card on page 43)

NEW JIFFY FLOOR is formulated to quickly repair expansion joints, floor cracks and other surface defects according to The Monroe Company, Inc. A fine granular, ready-to-use plastic product, Jiffy Floor readily fills hairline cracks, shallow holes or spalled floors. It can be applied without disrupting production or traffic and withstands heavy loads immediately

after application. The product contains no asphalt, cement, sand or gravel. The company advises that it will not crack, crumble or curl and can be applied either indoors or out. It is not affected by temperature changes.

When applied, Jiffy Floor is said to be waterproof, dustless, skid-proof and noiseless. It is delivered in 5-10-30 and 55-gallon drums, ready for use. No mixing is required. An outstanding feature is its extreme ease of application which consists merely of priming, filling and tamping.

BOAT LEAK WARNING DEVICE

(Use Key # 781 on Inquiry Card on page 43)

A NEW device called the Marine Weather-Guard has been developed by Micro-Moisture Controls, Inc. It detects leaks in any kind of motorboat or sailboat long before they would be apparent otherwise, and sounds an alarm so that appropriate safety measures can be taken.

According to the company, the unit contains a moisture-sensitive electronic grid, designed to close an electrical circuit as soon as it comes in contact with water. The grid is enclosed in a metal box, which is installed in the boat's bilge. The box is splash-proof, so that the normal amount of bilge water in the hold, splashing around as the boat moves, will not set off the alarm. Should the water level in the hold rise permanently to the level of the box, the grid closes a circuit and sets off a bell alarm.

CHANGEABLE COPY SIGN

(Use Key # 782 on Inquiry Card on page 43)

THIS 10 feet x 10 feet changeable copy sign, made by Wagner Sign Service, Inc., for promoting the safety campaign at the Motor Truck Division of International Harvester Company, Fort Wayne, Indiana has just been installed by the Safety Equipment and Supply Company of that city. Outstanding effectiveness and low cost impact results from the constant change of messages.

A new brochure describing this type of equipment will be sent free to anyone using the key number above on the reader's inquiry card.

ACID HANDLING CARBOY

(Use Key # 783 on Inquiry Card on page 43)

A NEW, lightweight polyethylene container for handling acids has been introduced by the Industrial Safety Supply Co. Available in 6½- and 13-gallon capacities, the chemically inert container is suitable for shipping, storing or handling many corrosive liquids. The container, known as Poly-Box Carboy, is packed in a wood jacket which features a liquid level slot and triangular corner posts for rugged use.

According to the company, the bottles will flex but not crack when contents are frozen or subjected to varying atmospheric

pressures. The carboy is easy to fill and pour and fits all acid handling equipment. It is suitable for use in the chemical, electrical, pharmaceutical, oil and related industries.

WELDER'S EYE-DROPS

(Use Key # 784 on Inquiry Card on page 43)

WELDER'S PAL eye-drops, a combination of soothing and emollient drugs, for use in relieving the effects of keratitis (eye irritation from exposure to arc radiation or intense light) have been made available by the Carhoff Co. The liquid drops spread readily over the cornea and pro-

duce a soothing and cooling effect to inflamed or gritty eyes, the company claims.

The product is of special interest to first aid departments, welders, steelworkers, blast furnace or open hearth operators, test or research workers and, generally, anyone exposed to arc radiation or intense light. Prepared and packaged by a registered pharmaceutical chemist, the drops are administered with an unbreakable, pliable plastic dropper.

AUTOMATIC WATER-ACTIVATED LIFEJACKET

(Use Key # 785 on Inquiry Card on page 43)

AN AUTOMATIC water-activated lifejacket has been introduced by the British Mercantile Co. Known as Safety King, the lightweight jacket packs flat on the wearer, permitting freedom of body movement. A triggering device for its CO_2 cylinder automatically inflates the jacket when immersed in water. This device is protected against accidental triggering caused by heavy rain. The jacket is said to be positively self-righting, will always keep the wearer's head above water and cannot float him face downwards.

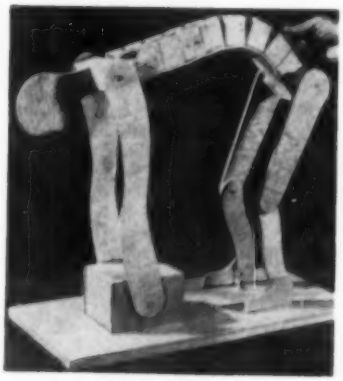
The life jacket consists of a gas inflated stole attached to a strong webbing harness. It is inflated by a small CO_2 cylinder fired by a water-activated mechanism. An oral inflation tube and valve is provided and may be used for topping up or deflation. The harness is fastened by a single belt clip at the front and is size-adjustable. The complete life jacket weighs 1 lb., 13 oz. The life jacket should prove of value to personnel engaged in activities in and around water.

HIGHLY-ABSORBENT PAPER TOWEL

(Use Key # 786 on Inquiry Card on page 43)

A NEW C-Fold paper towel with high moisture absorbency has been introduced by Scott Paper Co. The new towel, marketed as UHA (Ultra High Absorbency) Towel No. 151, incorporates improvements claimed to set new standards of absorbency, softness, appearance, and efficiency in paper towels. It replaces the Scott-Tissue C-Fold Brand No. 15 towel.

One feature of the towel is its contoured surface appearance, resembling fine cloth. An embossing process developed by Scott produces the stippled surface and is the reason for the new towel's high absorbency. This manufacturing operation produces greater porosity, bulk, and thickness. The contoured surface is said to provide nearly 50 percent more surface area than conventional paper towels with equivalent surface areas, and allows the face to be wiped clean without discomfort. Another important advantage of the UHA Towel is its wet strength. It enables the towel to be subjected to wiping or rubbing without tearing or shredding. The towel can also be used over beard stubble without depositing unsightly lint. The new towel measures $10\frac{7}{16}$" x 14" and is packaged 150 towels to a board sleeve. The towels fit C-Fold cabinets already in use.



LIFTING TRAINING AID

(Use Key # 787 on Inquiry Card on page 43)

A MOVABLE, human-shaped training aid that performs lifting actions has been introduced by Training Aids. The device, 24 inches high, is designed to demonstrate the proper, as well as the improper, method to lift objects from the floor.

By demonstrating correct lifting techniques, Lifty, as the aid is called, can help to prevent hernias and back injuries to personnel. It will show why lifting should be done with the legs and not the back, and what happens to the back when lifting is done incorrectly. The training aid is made of wood, is three-dimensional and available in lacquer finish or colors.

COMPACT EXTENSION PLANK

(Use Key # 788 on Inquiry Card on page 43)

UP-AND-DOWN climbing and frequent ladder moving are said to be reduced to a minimum with a new extension plank introduced by the Goshen Mfg. Co., Inc. The compact plank, four feet long when closed, extends to almost seven feet, a practical length for smaller-sized wall areas. According to the manufacturer, it will save time and effort and provide easy access to work for masons, painters, maintenance men, etc.

The lightweight, durable plank is constructed of wood. Free-action telescoping permits ease and convenience in handling. Footing is level and safe, with ample room provided for maintenance equipment, paints, etc.

HEAT RESISTANT FABRICS

(Use Key # 789 on Inquiry Card on page 43)

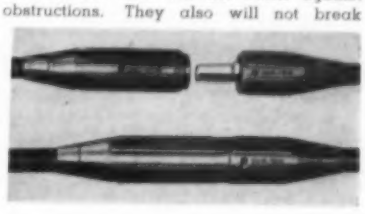
RAY-TEX, a fire and heat resistant fabric that is said to be tough, durable and versatile, combines an aluminum compound with a fabrication of tough cotton cording. According to the company, Frommelt Industries, the fabric will not crack, peel or slough off in heat or cold. It is highly resistant to rough usage, to oils, greases and most acids and alkalis and can be easily cleaned with solvents, steam or soap and water. The product is available in fire blankets, self-standing shields, curtains, drapes, covers and other similar items.

The company has also announced an improved version of its Ray-Foil radiant heat protective fabric. Retaining the best protective qualities of the original, it is said to have greater strength, flexibility and durability. Mylar, a method of laminating the metallized coating to the fiber glass fabric, is credited with producing the improved fabric. Ray-Foil is available in shields, curtains, drapes and various garments developed to provide reasonably comfortable working temperatures within inches of high radiant heat.

WELDING CABLE CONNECTORS

(Use Key # 790 on Inquiry Card on page 43)

INTRODUCED by Jackson Products, these Quik-Trik neoprene rubber insulators, strongly built around steel sleeves, have tapered ends to stretch over the welding cable snugly. They lock out moisture, oil and dirt and will not catch against obstructions. They also will not break



and scatter, leaving the electrical connection exposed.

No capital equipment is needed for installation. Time-consuming vulcanizing is unnecessary. Simply loosen an Allen screw, slide off the insulator and slip it over the cable end. Then, connect cable as usual, slide back the insulator and tighten. Inside, two high-copper alloy sections are tapered together for greater metal-to-metal contact in a quickly detachable connection. With a twist of the hand, a steel locking bar rides a cam to lock the sections together. Model 2/0-R takes cables 1/0 and 2/0 with mechanical, soldered or brazed connections. Model 4/0-R takes cables 3/0 and 4/0, soldered or brazed connections only.

FLOOR WAX

(Use Key # 791 on Inquiry Card on page 43)

A NEW water-emulsion floor wax formulated to give high performance and reduce rewaxing frequency has been developed by the makers of Johnson's Wax, S. C. Johnson & Son, Inc. The product is called Waxtra.

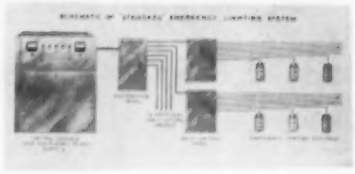
The wax is said to offer more brightness when first applied and after each buffing, longer wear under heavy traffic conditions, fine slip-retardant properties, greater dirt and water-spotting resistance, and absence of streaking or smearing. It is applied in the same manner as other self-polishing floor waxes. The product is available in 5-, 30- and 55-gallon drums.

CENTRALIZED EMERGENCY LIGHTING SYSTEM

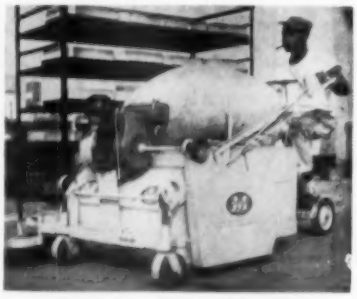
(Use Key # 792 on Inquiry Card on page 43)

A NEW centralized emergency lighting system that constantly supervises itself has been tested and approved by Underwriters' Laboratories. The system, which is designed to provide emergency illumination throughout public and private buildings, is said to exceed the requirements of the National Electrical Code.

Because emergency equipment must always be in operating condition, safety authorities have insisted that fire alarms, sprinkler systems, etc., be self-monitored. Manual inspections and tests are not enough and cannot be relied upon. Such



equipment must report faults or disarrangements at the time they occur, before an emergency arises. The new system not only reports, by flashing lights and buzzers, any fault to the system but even sounds an alarm when an emergency lamp is removed from its socket. This built-in supervision makes the system foolproof and gives full assurance that emergency lights will go on whenever regular power fails. In operation, the system is instantaneous and fully automatic. The control console and distribution panel are located in an area away from the danger of fire or flooding. Area control panels are located in areas containing its circuits. Lighting fixtures are placed at strategic points. Emergency lights go on the instant regular power fails and go off when power is restored. The special 23 volt battery is automatically recharged and kept at full capacity by a constant trickle of charging current. A nickel-cadmium battery, reportedly good for 25 years or more, is used. This battery uses an alkaline electrolyte that does not corrode or give off obnoxious fumes. It will not deteriorate the plates of the battery. The emergency lighting system is made by the Standard Electric Time Co.



NEW POWER SWEEPER

(Use Key # 793 on Inquiry Card on page 43)

SWEEPING time can be greatly reduced with the use of a new power sweeper, according to the manufacturer, the Modern Power Sweeper Co. In tests, the sweeper, known as the Industrial Special 36, was able to sweep 30,000 square feet twice a day in one-half hour. To cover the same area by hand sweeping, more than fifteen men would have been required to complete the job in the same length of time, it is said.

The sweeper operates with equal efficiency both indoors and outdoors, and can be used for sweeping parking areas, storage areas, loading and unloading points, etc. It features a side broom that cleans along walls and curbings and will sweep up heavy objects as well as dust, paper, leaves and cuttings. A sulky attachment permits the operator to ride while sweeping.

GAS DETECTING CRAYONS

(Use Key # 794 on Inquiry Card on page 43)

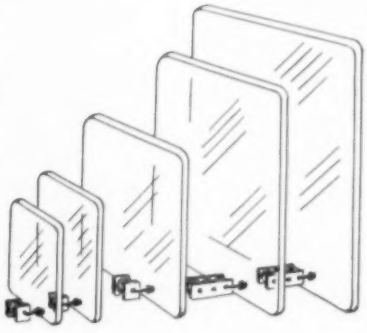
SENSITIVE detector crayons for the detection of phosgene, hydrogen cyanide, cyanogen chloride, cyanogen bromide and lewisite have been made available by the Aromil Chemical Co. These crayons will write on paper, wood or any other suitable writing surface, and the resulting mark will reportedly turn to a distinctive color when exposed to very low concentrations of the appropriate gas. Since each crayon is said to be good for hundreds of tests, Aromil claims that they provide a simple, convenient and inexpensive means to test for the presence of these toxic gases, and for detecting and locating leaks in cylinders and gas containing systems.

The crayons are said to retain their high sensitivity for many months. The phosgene detector crayon, for example, is reportedly able to detect 1 p.p.m. of phosgene in less than one minute. As adopted by the American Conference of Governmental Industrial Hygienists, 1 p.p.m. is the maximum average allowable concentration for human exposure to phosgene over an eight hour work day. A less sensitive crayon for the detection of phosgene is also available. Although both crayons are said to be useful for detecting the site of a leak, the company especially recommends the use of the less sensitive crayon for testing in an atmosphere containing traces of phosgene. The hydrogen cyanide detector is said to detect 10 p.p.m. of hydrogen cyanide in less than five minutes. This concentration has been adopted as the maximum average allowable concentration for exposure to hydrogen cyanide over an eight-hour work day. A higher concentration of gas is said to give a more rapid test, in proportion to the gas concentration.

MAGNETICALLY-ATTACHED SAFETY SHIELD

(Use Key # 795 on Inquiry Card on page 43)

THE DILLEY Mfg. Co. has announced a new, giant-based, magnetically-attached safety shield to protect operators of automatic or manually operated machinery. Known as Grip-Shield, the transparent plastic shield allows the work operation to be viewed while guarding the operator against flying chips, dust particles, sparks,



etc. A heavy-duty magnet secured to the base of the shield allows it to be placed on machinery wherever necessary, and in the working position desired.

The shields are available in a wide range of sizes of from 6 x 8 inches to 16 x 20 inches. Special sizes are custom-built to order.

GLOVE COLOR CHANGES

(Use Key # 796 on Inquiry Card on page 43)

TWO MODELS in the Stanzoil industrial glove line have been given a change in color. RSW-13 and NS-35 Stanzoils are now a new coral tone instead of the previous red, the Pioneer Rubber Co. has announced.

Safety and psychological factors entered into the decision to make the change, it is said. The bright coral shade is easily noticed, minimizing the chances of hands being damaged in plant accidents. In addition, the new color is more pleasing to the eye and makes hand protection more attractive to employees. RSW-13 sheer Stanzoils are lighter gauge than surgical gloves. They have the high tensile strength, tear resistance and chemical resistance of DuPont milled neoprene. Also resistant to chemicals because they are made of milled neoprene are the NS-35 flock-lined, embossed surface, non-slip grip Stanzoils, especially designed for comfort, protection and dexterity.

TWIN FRONT STEPLADDER

(Use Key # 797 on Inquiry Card on page 43)

A NEW heavy-duty stepladder has been added to the W. W. Babcock Company's line of ladders. Known as the Twin Front safety stepladder, it is designed with steps on both sides and is suitable for a wide variety of uses.

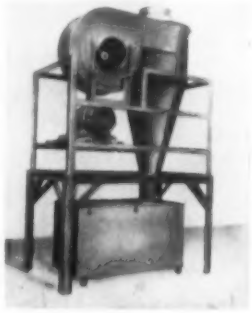
Side rails for the ladder are $1\frac{1}{16}$ x $3\frac{1}{4}$ inches; the steps on both sides are 1 x $3\frac{3}{4}$ inches and reinforced with $\frac{1}{4}$ inch steel rods. Heavy-duty "U" hinges and steel spreaders are said to assure rigidity. The ladder is listed by Underwriters' Laboratories, Inc.

HEAVY-DUTY DUST COLLECTOR

(Use Key # 798 on Inquiry Card on page 43)

AGET MFG. CO has announced a new new addition to their line of dust and mist collectors. This unit, known as the 90 NB 50 is designed for use in grinding, buffing, woodworking and miscellaneous operations where a large volume of dust, chips, shavings and other residue accumulates from manufacturing processes.

A feature of the 90 NB 50 is its roll-away dust collecting bin, which has a storage capacity of $37\frac{1}{2}$ cubic feet. This bin, of heavy, reinforced cold rolled steel, moves on large rubber-tired ball bearing casters. It can be pushed to the dumping spot or it can be pulled out from under the collector where a fork lift truck can handle it. Bin top is held in place by



clamps, and a flexible hose runs from the cyclone outlet to the bin lid. The lid is lifted upward automatically by springs when clamps are raised. This collector has an air handling capacity of approximately 10,000 CPM and uses a 15 H.P. motor. The fan inlet will accommodate 15" pipe. Overall dimensions are 48" deep, 82" wide by 124" high.

NON-FREEZE MODEL LADDER SAFETY DEVICE

(Use Key # 799 on Inquiry Card on page 43)

THE SAFETY Tower Ladder Co. has announced that hollow tubing used with their ladder safety device can be equipped with an electric heating cable to prevent possible cold-weather freeze-ups. Steam, air, exhaust or other types of heating may also be effectively employed. The device is not affected by rain, ice, mud, oils, etc., making it safe to use under almost any conditions, the company states.

The ladder safety device consists of a belt-worn device which attaches to a movable unit fitted on the tubing (which is itself attached to the ladder). As the worker ascends or descends, the device follows him. In the event of a fall, the device locks on the tubing within inches of the spot where the fall began.

SPRUE REMOVAL TOOL

(Use Key # 800 on Inquiry Card on page 43)

THE OSBORN MFG. Co. has announced a new tool for removing castings from die casting machines. Designated the Sprue-

master, the device is made of a high tensile aluminum alloy which, because of its light weight, is said to lessen operator fatigue while increasing working efficiency.

Made in various lengths, the tool is designed so that its cone-shaped head will fit a wide range of sprue sizes. A hardened steel plunger, activated by a lever on the handle, grips the sprue securely with a minimum of necessary leverage. Relaxing pressure on the lever instantly releases the casting. Use of the tool keeps the operator clear of the dies at all times, eliminating the danger of burned or crushed hands and fingers. Available in 10- and 15-inch shaft sizes, for either right or left hand feed and with several sprue sizes and shapes.

WELDED OPEN GRATING

(Use Key # 801 on Inquiry Card on page 43)

AN IMPROVED heavy duty open steel floor grating has been introduced by the Globe Co. Designated Gold Nugget welded grating, it is designed with a primary load bar that is a miniature I-beam with all of the advantages of a true structural member. This primary load bar is said to provide 22 percent more strength with 14 percent less weight.

The gratings feature an anti-skid pattern for added safety. Vertical alignment of the main load bars is assured, according to the company, and all bars are load carrying bars. Additional strength and rigidity are furnished by the $\frac{3}{8}$" projection weld nugget. The grating is recommended for power houses, loading clocks, oil refineries, fire escapes, drain grates, plating rooms and for all types of heavy duty platforms.

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Guard them!

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For Accident Prevention

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ACCIDENT PREVENTION • *steel* SIGNS IN STANDARD COLORS AND DESIGNS

(For details, use Key # B-44 on card on page 43)

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first aid for throat irritations

SORE THROATS due to coughs and colds, if neglected, may result in lost man hours of work.

THANTIS® Lozenges contain no antibiotic; they produce no unpleasant by-reactions in the mouth.

THANTIS Lozenges relieve pain promptly—reduce infection—act prophylactically.

Twenty-seven years' extensive clinical and lay use has proved the safety and effectiveness of this popular product.

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